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ACORN USER

OCTOBER 1987

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ADVENTURES: Lighting the dark ages at school

DESIGN COUNSEL: How to write better programs



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Stands 3044 and 4211
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	10	30	50	100	250
SS/DD	6.55	18.55	29.05	53.10	118.00
DS/40T	7.90	22.30	34.90	64.60	144.50
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Have two write protect notches & index holes.
Suitable for 40 or 80 track drives.

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	10.55	30.00	47.40	88.10	204.55

3½ MICRO MEDIA Brand

	10	30	50	100	250
SS/DD	17.55	50.45	80.25	147.70	347.80
DS/DD	18.75	53.90	85.95	159.20	376.55

5¼″

All discs supplied are with labels, 5¼″ write protects, envelopes & hub rings.

Discs purchased direct from one major manufacturer. 100% certified error free – lifetime guarantee.

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3½″

5¼ Rainbow Discs come in five colours

	25	50	100	250	500
SS/DD	16.50	30.75	57.10	134.50	252.45
DS/40T	17.95	33.10	60.70	141.45	262.20
DS/80T	19.00	35.20	64.85	148.75	276.00

5¼ Unbranded Discs

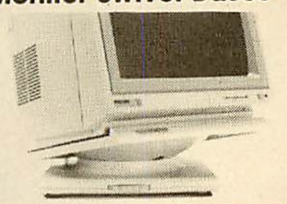
SS/DD	9.80	19.35	36.40	86.55	163.85
DS/40T	10.95	20.65	38.20	89.70	172.50
DS/80T	13.55	25.65	47.85	113.55	216.20

3½ Unbranded Discs

	10	30	50	100	250
SS/DD	15.10	42.60	65.95	117.70	264.75
DS/DD	16.20	45.70	72.95	128.50	290.00

PCW SHOW - STANDS 3044 & 4211 - PCW SHOW - STANDS 3044 & 4211 - PCW SHOW

Monitor Swivel Bases



Pan tilt revolves around 360 degrees
12.5 degrees tiltable up and down
Adjustable by front mechanism.

55x280x260mm for 12″ Monitors		55x355x320mm for 14″ Monitors	
1	13.25	1	16.70
3+	12.60 ea	3+	15.90 ea
6+	11.95 ea	6+	15.05 ea

Adjustable Copy Holder

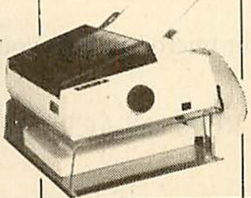


A4 adjustable desk clamping.
Magnifying cursor line.
Paper thickness adjustment.
Paper height adjustable clip.

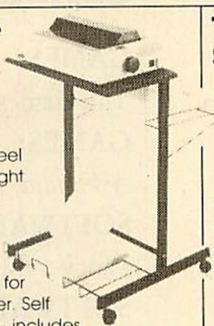
A4 Version 24.00
Holds up to 300g
Desk Top Version 13.69
Holds up to 1000g
A3 Version 42.45
Holds up to 1400g

Printer Stand
5mm perspex

80 Column Version
400 x 310 x 100mm
22.80
132 Column Version
600 x 310 x 100mm
28.60



Mobile Printer Stand



Rugged steel frame. Height adjustable basket for output paper & base shelf for input paper. Self assembly – includes castors.

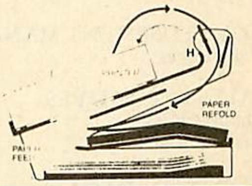
80 column £52.50
132 column £67.90

The Space Saver



Paper feed and refold positioned one above the other. Dial controlled paper feed with adjustable deflectors ensures smooth flow and automatic refolding.

80 column 414x380x460mm		132 column 530x380x460mm	
1	34.40	1	43.00
3+	32.10 ea	3+	40.70 ea
6+	30.50 ea	6+	38.65 ea



Printer Ribbons

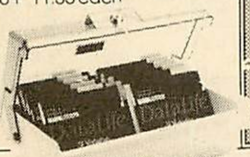
Prices (£) per each ribbon	3	6	12
Amstrad 8512/8256	5.65	5.35	4.90
R, G, BR, BL, Y	7.50	7.10	6.55
DMP 2000/3000	2.80	2.60	2.35
Brother HR15 MS	3.30	3.10	2.80
R, BR, BL	4.35	4.10	3.75
Centronics GLP	3.65	3.45	3.15
R, G, BR, BL, Y	4.65	4.40	4.00
Canon 1080/1156	3.30	3.10	2.80
R, G, BR, BL, Y	4.95	4.65	4.25
Citizen 120 D	4.70	4.35	4.15
Diablo Hytype II MS	2.80	2.65	2.40
R, BR, BL	3.80	3.55	3.25
Epson			
FX/MX/RX 80 FX 800	3.55	3.35	3.10
R, BR, BL, G, Y	4.95	4.65	4.25
MX 100/FX 1000/FX 105	4.65	4.35	4.20
R, BR, BL	5.85	5.55	5.10
LX 80/86 GX 80	2.80	2.65	2.40
R, G, BR, BL, Y	4.70	4.45	4.05
Juki 6100 MS	3.30	3.10	2.80
6100 SS	2.05	1.90	1.75
R, BR, BL	2.75	2.60	2.35
Kaga KP810/910	3.30	3.10	2.80
R, G, BR, BL, Y	4.95	4.65	4.25
M/Tally MT80 MS	4.10	3.85	3.55
Panasonic KXP110	5.50	5.20	4.75
R, G, BR, BL, Y	7.20	6.80	6.25
Qume IV MS	3.30	3.10	2.80
Fabric	3.30	3.10	2.80
Star NL 10	5.50	5.20	4.75
Shinwa CP80 MS	4.10	3.85	3.55

One off if ordered with other product
Please mix colours and types for best prices
R = Red, BR = Brown, BL = Blue, G = Green, Y = Yellow

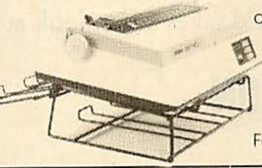
If the ribbon you require is not listed please let us quote

The above is a small selection of the 250 different ribbons we stock. We shall be pleased to find your ribbon, however old or obscure.

MD 120
5¼″ x 120
1 12.55
3+ 11.90 each
6+ 11.35 each



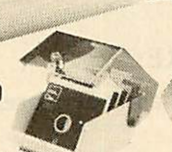
Wire Printer Stand



stacks print-out in document tray automatically. Suitable for most standard printers. Made of safety coated steel wire.

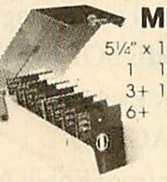
For 80 column £14.80

MD 50



5¼″ x 50
1 7.80
3+ 7.40 each
6+ 7.10 each

MD 100



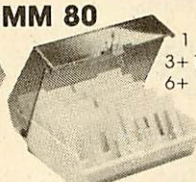
5¼″ x 100
1 10.80
3+ 10.30 each
6+ 9.80 each

MM 40
3½″ x 40



1 8.30
3+ 7.90 each
6+ 7.50 each

MM 80
3½″ x 80
1 10.95
3+ 10.40 each
6+ 9.90 each



Computer Labels
Continuous fanfold, sprocket fed

	Price per 1,000	3,000
70x36	4.80	13.20
89x36	4.90	13.50
89x49	6.80	18.30
102x36	5.20	14.40

Please state no. of labels across the sheet (1, 2 or 3)

Computer paper
Plain fanfold, micro perf edges

Size	Weight gsm	1000s per box	1 box	3 bxs +
11x9½	60	2	16.90	42.90
	80	2	20.90	51.00
Exact A4 11⅔x9¼	70	2	22.50	57.50
	90	1	16.90	44.00

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Baker Street, Potters Bar, Herts. EN6 3BR

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Please allow 5 days for delivery.
For next day delivery, please ring for details. Postage covers U.K. only.

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Ring or write to obtain your copy now!

Educational and HMG orders accepted. For official orders/invoice/credit orders there is a minimum order value of £15.00 excluding V.A.T. Any order under £15.00 will be subject to £3.00 handling charge.

Personal callers welcome
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Saturdays 9.30am - 1.00pm

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ACORN USER

ISSUE No 63 OCTOBER 1987

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FEATURES

COVER



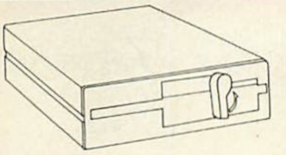
Illustration by Michael Bennett

NEXT MONTH

Your business is our business; Joe Telford builds a toolkit of programs, Rob Macmillan examines uses for *View Professional*, Bruce Smith reviews *InterBase* and we explain macros

The Perfect Partners.

VIGLEN DISK DRIVES



Simply plug a Viglen disk drive into your BBC B (fitted with DFS), B+, or Master micro and immediately benefit from 400 or 800 KB of extra data storage capacity.

Stock Code	Description	Price inc. VAT	
VPD 0241	400K Single Drive, No PSU	£119.95	NOW WITH 3-YEAR WARRANTY
VPD 0246	400K Single Drive, + PSU	£134.95	
VPD 0243	800K Dual Drive, No PSU	£222.95	
VPD 0248	800K Dual Drive, + PSU	£249.95	
VPD 0249	800K Bridge Unit + PSU	£264.95	
VPD 0250	5.25" + 3.5" Combined + PSU	£249.95	
SPO 14	Single 400K 40/80T Drive	£ 99.95*	SPECIAL OFFER
SPO 19	Dual 800K 40/80T Drive	£189.95*	

* These two models are offered with 12 months warranty

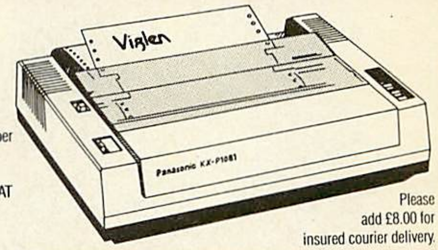
Please add £8.00 for insured courier delivery.

PANASONIC PRINTER KIT

The Panasonic KX-P1081 comes complete with £45.00 worth of accessories FREE including tractor feed and roll feed units with paper, printer cable, and a specially designed metal printer stand.

Features include:

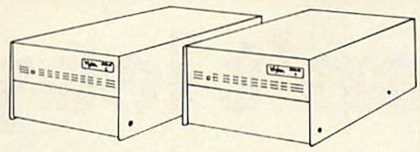
* 120 cps draft printing, 24 cps NLQ
* IBM and Epson compatibility through dip switch settings
* Prints 80 columns on A4 cut sheets, continuous stationery or roll paper
* 9×9 draft and 18×23 NLQ



Stock Code	Description	Price inc. VAT
SPO 79	Panasonic KX-P1081 plus accessories	£189.95

Please add £8.00 for insured courier delivery.

VIGLEN WINCHESTER DISKS

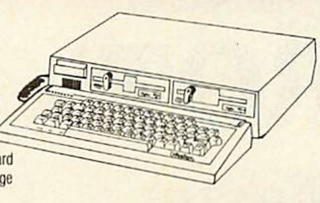


Plug-in 20 to 112MB of extra storage with the Viglen Winchester system.

Please add £8.00 for insured courier delivery.

Stock Code	Description	Price inc. VAT
Drive 0 Single		
V0150	VB20 20MB Viglen Winchester	£ 649.00
V0152	VB28 28MB Viglen Winchester	£ 699.00
V0155	VB40 40MB Viglen Winchester	£1045.00
V0156	VB56 56MB Viglen Winchester	£1119.00
Drive 1 Second Drive		
V0160	VB120 20MB Drive 1 Winchester	£ 549.00
V0162	VB128 28MB Drive 1 Winchester	£ 599.00
V0165	VB140 40MB Drive 1 Winchester	£ 819.00
V0167	VB156 56MB Drive 1 Winchester	£ 899.00
V0157	20MB Tape Streamer Backup	£ 724.95

PROFESSIONAL CONSOLE UNIT

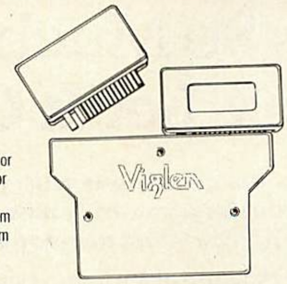


Give your BBC or Master micro a professional PC-look by replacing the existing lid with this smartly styled package which can house two disk drives. Complete with separate keyboard case and connecting cables. A full range of accessories is also available.

Stock Code	Description	Price inc. VAT
V0851	Viglen Professional Console Unit for the BBC micro	£49.95
V0861	Viglen Master Console Unit for the Master micro	£59.95

Please add £8.00 for insured courier delivery.

ROM CARTRIDGE SYSTEM



Designed by Viglen for use with the BBC B or Master micros, the Rom Cartridge System allows a range of Rom software to be used and interchanged easily without fear of damage to the delicate pins. The system is simple to fit and requires no soldering.

Stock Code	Description	Price inc. VAT
V0560	Viglen Rom Cartridge System for BBC	£12.95
V0559	Viglen Rom Cartridge System for BBC (low profile)	£12.95
V0550	Viglen Rom Cartridge System for Master	£14.95
V0561	Single Viglen Cartridge	£ 3.99

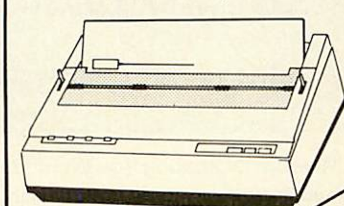
Please add £2.50 for postage and packing (£00.50 for single cartridge).

DAISYWHEEL PRINTER

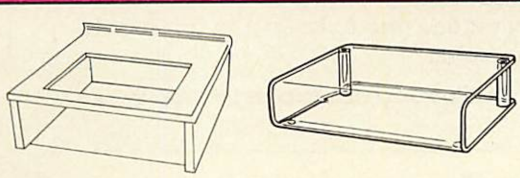
The Panasonic KX-P3131 daisywheel printer is Diablo-compatible and utilises bi-directional logic seeking techniques to produce letter quality print at a rate of 17 characters per second (cps). Friction speed provides really efficient paper handling, whilst tractors are available as an option.

Stock Code	Description	Price inc. VAT
V0400	Panasonic KX-P3131 Daisywheel Printer	£299.95

Please add £8.00 for courier delivery.



PRINTER STANDS



Viglen's printer stands are available in	Price inc. VAT
clear perspex, 80 col.	£19.95
136 col.	£29.95
high-impact ABS plastic colour-matched to most printers. 80 col.	£14.95
black metal finish	£ 9.95

Viglen's printer stands cater for 80 and 136 column printers and allow continuous stationery to be stored underneath.

Please add £3.00 postage and packaging.

Send NOW for our special offers booklet

SALES HOTLINE 01 843 9903

HOW TO ORDER

Simply fill in the coupon or write to us with your requirements enclosing a cheque/postal order or your credit card no. for the total amount. Don't forget to add the cost of delivery. Allow 7 to 10 days for delivery. Credit card holders may order by telephone on our sales hotline 01-843 9903 (8 lines). Orders from overseas should be exclusive of VAT (Please deduct 15% from the total cost).

Prices correct at time of going to press and offers are subject to availability. Dealer, Trade & Education Enquiries Welcome.

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Telex: 919 304 VIGLEN G
Fax: 01-574 5126

Fill in and post to Viglen Ltd., Unit 7, Trumpers Way, London W7 2QA. Tel. No. 01-843 9903. Please make cheques and postal orders payable to Viglen Ltd.

STOCK CODE DESCRIPTION QUANTITY TOTAL PRICE

Please find enclosed a cheque/postal order ☐ I prefer to pay by VISA ☐ ACCESS ☐ Tick one please. Carriage ______

Card No. ______ Signature ______ Expiry date ______ Total ______

Name ______ Address ______

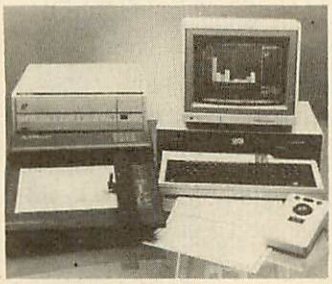
Postcode ______ Tel. no. ______



NEWS

Hard copy from Domesday

The wealth of information in the Domesday system is no longer trapped in the machine. It's now possible to get printouts of the thousands of tables and charts.

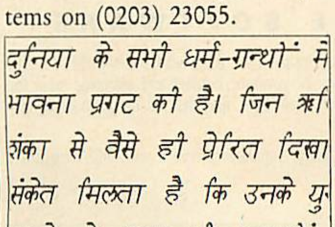


Plotmate: AIV printouts

Linear Graphics has produced software which processes data on the National disc into pie, bar and line charts, and is free with the Plotmate range.

News in brief

■ Following the success of its Punjabi wordprocessor, RS Computer Systems has released a Hindi version. The company has already had a good response to the product from dealers in India, but it also hopes to sell the package to schools here. Details are available from RS Computer Systems on (0203) 23055.



Hindi wordprocessing

■ *Screenprint* is a program which dumps the current screen to a printer. Its supplier, ESM, claims that it will work with almost any software, and requires just two key presses. The price is £25. Contact ESM on (0945) 63441.

Multi-tasking for Archimedes

The Archimedes is set to take on Commodore's Amiga 2000 with a new multi-tasking operating system, enabling the computer to run several programs at the same time.

Acorn's David Bell confirmed that it is working on a Unix-like operating system for the Acorn RISC Machine (ARM) chip, but stayed tight-lipped about the details.

There has been speculation that the system is called ARX; the name appears on some internal Acorn documentation.

But multi-tasking is greedy on memory, so the new system will be for the 400 series only.

Another future ARM-based machine will be aimed at the engineering and graphics work station market. This will use faster, but much more expensive, memory chips. This in turn means the ARM processor can run faster. And redesigned video and memory controller chips will allow more memory and even better graphics.

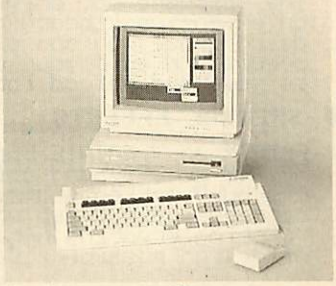
Acorn has cleared up some confusion about the high resolution graphics in the 400 series machines.

The 300 and 400 series work identically in all modes up to mode 20, but extra circuitry in the 400 series allows it to go beyond a resolution of 640 by 512. Two extra screen modes are available offering graphics resolutions of up to 1280 by 976 in monochrome, and 160 columns by 122 lines of text, but only using a special monitor.

This makes the machine ideal for computer-aided design, and Acorn aims to implement the industry standard package, *AutoCAD*, on the Arc.



Amiga: multi-tasking plus DOS



Arc: faster competitor

Microvitec monitors can be made to work with the Arc's RGB output, but the picture quality is poor. The company is producing an Arc-compatible monitor soon.

■ Acorn has announced two separate systems for running IBM PC compatible software on the Archimedes.

The first is an emulation of the IBM PC's 8088 chip. It's similar to the 6502 emulator, being software based, and will run legal MS-DOS programs.

The other package is a podule with its own 80186 processor – like the Master's 512 co-processor but with an IBM-standard disc controller chip. Some PC software titles directly access this chip so it should be 'more compatible'. It also allows you to add a 5.25-inch disc drive, to read PC discs. Acorn claims the podule is 'faster than a PC-AT'.

■ The Arc is a finalist in this year's British Microcomputing Awards.

Micro market buoyant

The h~ ıe computer market is still alive and well, says a report by Key Note Publications.

Although the boom period has long gone, spending on home micros is on the increase again and should reach £390 million by the end of the year. At the same time unit sales are down, reflecting a shift from cheap, games-oriented machines towards more expensive, business-type micros.

Key Note defines home micros as machines costing under £500, which now includes cheap IBM PC clones. The report shows how, as a result, the market has shifted towards more serious uses – like wordprocessing and accounts.

The report also notes Amstrad's apparent takeover of the home micro market. Taking into account both Amstrad and Sinclair machines, the company now sells nearly two-thirds of all computers under £500.

The Home Computers/Software Report costs £89.

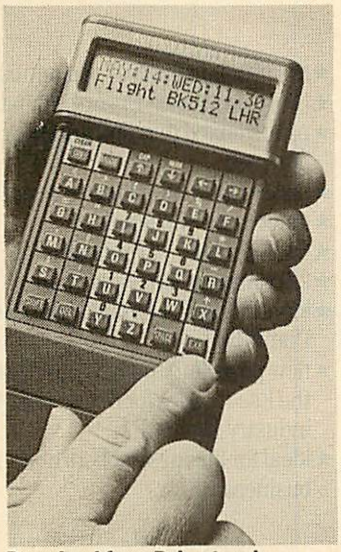
Upwardly mobile downloading

Trendy micro owners who've moved up from Filofaxes to Psion Organisers can now use their BBC micros to interrogate their electronic diaries.

The PERX package from XOB is a hardware and software link which allows you to program and read Organiser II datapacks using the BBC micro as a terminal.

The hardware link accepts one or two Psion EPROM packs. Software for the Organiser which has been developed on the BBC micro can be downloaded to the pack. Alternatively you can read your notes, addresses, etc from the datapack on to disc. The data can then be loaded into a word-processor or database.

Some schools have started using the Psion Organiser as a field notebook. XOB claims an ability to write specific programs for a field project could make the Organiser even more suitable for this kind of work.



Download from Psion to micro

The system may also interest small companies who want to produce multiple copies of a Psion program. The complete package costs £69.

Interactive video comes up roses

Interest in interactive video (IV) will grow even more now gardeners have their own software. Intersearch Systems has produced *Gardeners' Questions Answered*, an IV disc which works with the Domesday video disc player.

The disc contains around 2000 photographs of plant varieties, pests and diseases. It's aimed at schools as well as garden centres as a point-of-sale promotion. The user can select between commentaries in English and French.

The disc will cost around £400. Although it works with the Domesday system, Intersearch will supply it as a package with other hardware.

■ Intersearch has also developed a database, called *DISSL*, intended for use with the interactive video system, but also useable with text-only databases. *DISSL* allows you to set-up complex links between text, still and moving pictures which can then be interrogated by other users.

More on The Menu

Two utilities to make life easier with filing systems, ROMs and RAM have been launched by Camelot Computer Services. *The Menu* provides control of ROMs and disc files while *The List* allows you to add descriptive text to filenames. Prices to be announced.

THE COMMS COLUMN

David Atherton has taken over the new expanded Comms Column from Buzz, who will still be writing for us from time to time. If you have an interesting Comms story, send it to David here at AU, or direct to his mailboxes on Prestel (942876210) or Telecom Gold (72:MAG11596).

■ Telecom Gold's new tariff became effective on August 1, and includes a new data transfer charge of 4p (1p at evening cheap rate) per 512 characters, in addition to the per-minute charges which have been reduced from 11p (3.5p) to 6.5p (2p). PSS charges are not part of Gold and so are unaffected. The first 512 characters for each log-on are free. A 1200 baud user can receive over 7000 characters a minute, so the net cost could be as much as 62.5p per minute, an increase of over 400 per cent

The last article I submitted over Gold cost me 10.5p (three minutes). The 10,000-character file would now cost 25p, a hefty increase. Not surprisingly there has been a lot of adverse comment from journalist users. It'll be interesting to see what the general reaction is when the first bills using the data charge are issued.

Interlink, the Micronet gateway into Gold, delayed its introduction of the new charges for a month, and is not levying the new Gold £5 a month charge. Microlink, the largest user group on Gold, has delayed the increases for at least another month after that. Microlink is 'horrified' at the new tariff, but it looks like it too will have to implement it.

■ A new feature in the Comms Column is our spotlight on bulletin boards carrying material of interest to Acorn owners. MusicTel was started by the then 13-year-old James Eckhardt, covering all aspects of music, from amateur composing to straightforward pop and rock talk.

Now a nationwide network of nine boards, it is just about to install inter-board networking, among other new features. With MusicLink on Prestel currently dormant, this is one of the few places you can find Music 500 coverage. James, now 16, runs the headquarters board on 01-455 0843 (Scrolling, 8N1, V21/V23).

■ Until now there has been no way of directly transferring eight-bit files via any of the main email services. But Telecom Gold has now announced its new FT (File Transfer) service, which implements the popular Xmodem file transfer system, and also the newer Ymodem specification. Initially only available to corporate Gold subscribers, BT says that after an evaluation period the service will probably be offered to all users, including those who use Gold through Microlink and Interlink. For those who need file transfer now, Microlink offers the Kermit file transfer system.

■ An Open University student has solved the problem of not being able to talk to his colleagues by starting an email club. Jim Hatton, an OU science student based in Kilmarnock, was unhappy about not being able to talk about the course and his work with the other students, who are scattered around the country.

His solution was to start the Open University Club on BT's Microlink.

The club is aimed at both students and lecturers. The main advantage, Hatton says, is that he no longer has to bother his busy lecturers with telephone calls. They can now pick up his messages and reply to them in their own time, but without postal delays.

Micro on a diet

Your micro could help you live a bit longer. *Healthy Living* is a disc-based program which analyses your diet for energy, protein, carbohydrate, fat, minerals and vitamins.

The package has been put together by Epsilon Software, based on guidelines by the National Advisory Committee on Nutrition Education, an expert body concerned with producing guidelines on nutrition for the general public.

You tell the program what you eat and it calculates the amount of fat and saturated fat in your diet, measured as a percentage of the food intake, and also works out the quantity of fibre in the diet.

The results are compared with recommended values. Possible problems and deficiencies are highlighted and advice given about how to correct imbalances. Costs £12.99.

Professional View is a Pipe Dream

Any similarity between *View Professional* and *PipeDream* running on Clive Sinclair's Z88 portable is entirely deliberate.

They are, indeed, the same product, written by Colton Software, set up by Mark Colton (the original author of *View*). *View Professional* and *PipeDream* files are completely compatible. Sinclair's company, Cambridge Computer, will be marketing a connecting cable and transfer software to swap files between machines.

Teletext Logo

You can now use Logo to create teletext screens. Logotext is an extension to Logotron's version of the language which adds commands to control coloured text and graphics. The package is available from Redbridge Semerc. Tel: 01-478 6363.

Arc star attraction at Barbican centre

The star of this year's *Acorn User* show was undoubtedly the Archimedes. This was the first time the public had been able to see Acorn's supermicro, and crowds around the Acorn stand showed how much interest there is in the machine.

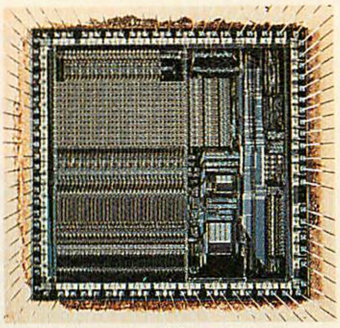
The show was opened on the trade and education day by Government minister John Cope, who is, among other things, responsible for small businesses.

Acorn attracted another large crowd when Roger Wilson, the man behind the RISC system and a rare sight outside the Acorn offices, gave a seminar talk on the Archimedes.

■ Advanced Computer Products had several new products on show, including the launch of the Advanced Quarter-Meg RAM (reviewed in this issue), the AP6 and Hybrid's Music 5000 running on the Electron.

The software for the synthesiser wasn't quite finished. ACP is busily converting from mode 7 to mode 6 screens. But the Music 5000 itself was working perfectly.

The AP6 is ACP's latest add-on for the Electron. It boasts six sideways ROM sockets and plugs directly into the ACP Plus One. Owners of the older Acorn Plus One will need to get it adapted.



RISC chip: star of the show

The basic unit should cost under £50. Two later options will include using two of the sockets for sideways RAM, and having these battery backed.

■ An auction at the post-show party raised around £250 for the Centre for World Development Education. And another auction held live over Micronet brought in a further £228.

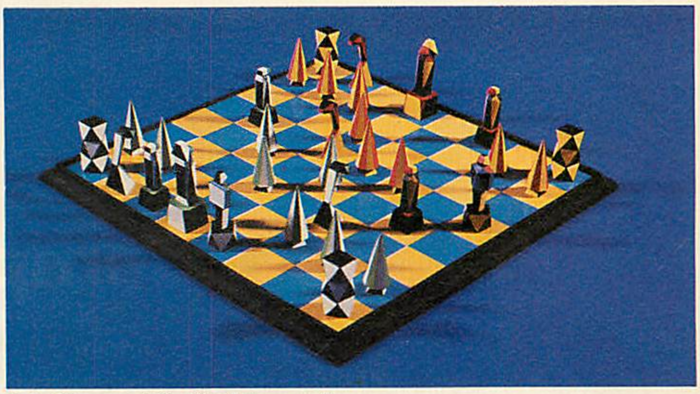
Several companies donated items, including a snooker cue signed by ace player Neil Foulds and generously given by Nazir Jessa of Watford Electronics. Nazir was equally generous in buying it back again for £145! Most of the other items were bought by Scots. Kenneth Hobbs of PMS wound up with a keyboard cover, while programmer Derek Mathieson bought an *Acorn User* front cover that never actually appeared. We threw in some BBC paper cups and the toothbrush previously belonging to show organiser Mike Kiy.

John Stewart of the Computer Depot dipped into his pocket for a bottle of House of Commons whisky, while SJ Research's Kim Spence-Jones bought a telephone.

Sentinel to queen's knight four

Model maker Peter Clements, famed for his miniature BBC micros featured in *Acorn User* January 1986, as well as for his Sentinel badges, and has just completed his latest masterpiece – a complete chess set based on the characters in the best selling *Sentinel* game from British Telecom's software house, Firebird.

A total of 600 hours painstaking labour went into the set. Pete, whose work is soon to be featured in *Creative Review*, has represented the king by the Sentinel, the queen by the robot, the bishop by the sentry, the knight becomes a meanie and the rook is transformed into three boulders. Finally the pawns are played by trees.



Pete Clements' *Sentinel* chess set

Pete, who also designed the AMX Mouse badges seen at the *AU* show, says the set is a one-off and not for sale – although if someone offered him the price of an Archimedes he might reconsider!


COMBO C
£235
MD802 F
£174
HD 2000
£609
UFD 2000
£782
ALL PRICES EXCLUDING VAT
BBC Compatible Disc Drives
COMBO C – 3.½" plus 5.¼" combination drive in 802C case without PSU
MD802F – Dual 800K drive 3.½" 40/80 track switchable
HD2000 – 20MB Winchester built into MD802E case with independent PSU Using ADFS including Winchester controller card and BBC host adaptor card
UFD2000 – 20MB Winchester and IBM floppy disk drive 40/80 track switchable housed in MD802DM case
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TEL: HARLOW (0279) 443521
Dealer Enquiries Welcome

Cut-price database

A new company has launched itself on to the Acorn software market with a database for less than a tenner.

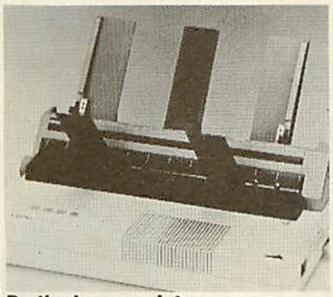
Raycomp has produced several versions of the database to make maximum use of extras like sideways RAM, second processors and shadow RAM. All machines are catered for, from the Electron to the Master Turbo, and an enhanced Archimedes version is planned for future release.

Anyone who buys the software and then needs to switch to a different system can have the data transferred at 'nominal' cost, according to Raycomp.

A separate graphics utility has also been launched which is capable of generating a variety of graphs and charts from the information in the database. The utility disc costs £7.50.

News in brief

■ *Wizard* is a new bulletin board with a few unusual extras. As well as mail services and message areas, the board offers credit and company check facilities and an agency service for private investigators. The board is on (0703) 631431 between 6pm and 12pm.



Brother's new printer

■ Brother is aiming to take more of the high quality printer market with its 1724 model. This 24-pin dot matrix has a speed of 216 characters per second in draft mode, with letter quality printing at 72 cps. The price is £695. Contact Brother on 061-330 6531.

PMS launches Genie upgrades

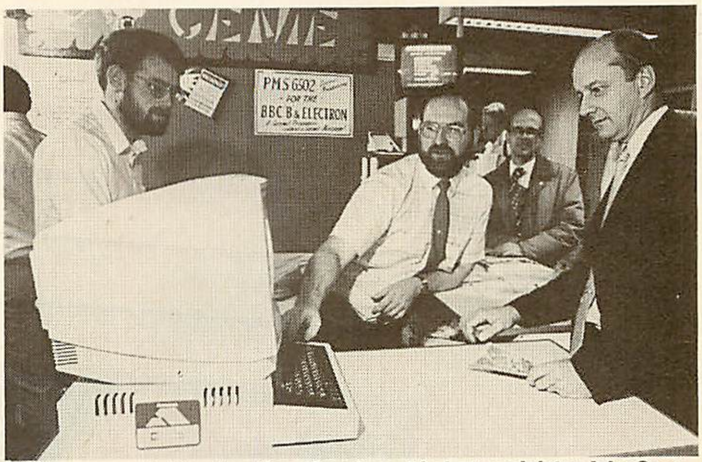
Permanent Memory Systems had a busy *Acorn User* show as many took the opportunity to get their hands on *Genie*, the package of pop-up utilities.

PMS used the show to launch upgrades and additions to the system. A version of *Genie* has been launched for Master owners. It comes in the Care Electronics cartridge which makes it simpler and less prone to damage when moving the package frequently from machine to machine.

There's an option of having 16k or sideways RAM in the cartridge. This is used like the RAM banks in the Master. The *Genie* cartridge costs the same as the standard model – £80. The sideways RAM is another on the top of that £15.

All *Genie* models now work with real time clocks in BBC Bs. Previously, unless you were using a Master you had to enter the time manually, now it's read automatically.

If you haven't got a clock, PMS can now supply one. The *Genie* Watch looks similar to a 32k ROM chip, and costs £29.90 to registered *Genie* owners (an extra £5 to everyone else). Also new is a utilities disc. This contains all the routines that had to be left out of the *Genie* ROM because there wasn't enough room.



***Genie* commands the attention of trade and industry minister John Cope**

The programs allow you to transport data to and from wordprocessors and databases. And there are new printout options, including label printing from *Genie*'s address book and week and month planners from the desk diary. The disc is available at £9.95.

Several companies used the exhibition to show-off software and hardware for the Archimedes – not all of it ready. Watford Electronics had an impressive real-time digitiser. The full game version of *Lander*, known as *Zarch*, was on the Superior stand, although in pre-production form.

AMS had the front end of its art package, *Finesse* on show. A fully working version is expected soon.

Minerva had a fully working version of its *Delta Base* package, complete except for the manual. And Computer Concepts had a new version of *InterWord* running under the 6502 emulator.

Customised chips

KM Sofware is offering a customised ROM service. You tell the company which utilities you want, and it will put them into a single chip.

A list of the utilities available is being compiled at the moment, but will include memory editors, disassemblers, ROM handlers, disc sector editors and programs for tape to disc transfer and formatting.

The cost is 25p for each 256 bytes of code (maximum 15k).

Interspan ready

User trials of Interspan, the electronic mail system launched by the directors of SJ Research, have now been completed and the company says it is ready to launch the service.

Following comments from users at the test sites, slight modifications have been made to the software. Further upgrades are likely, and will be supplied by sending the software direct using the Interspan system itself.

The service is unusual in that it phones the users, rather than the other way around. The main strength, according to the company, is that the system is based on the concept of sending and receiving file, rather than just text.

This makes it easy to transfer programs and data, as well as messages. Interspan is also one of the first British electronic mail systems to comply with the X.400 international standards, which were designed with file transfer in mind.



BBC Compatible Disc Drives

MD400B – Single 400K drive 40/80 track switchable, Double Sided, with PSU

MD400F – 3.½" Single 400K drive, Double Sided

MD802E – Dual 800K drive, 40/80 track switchable, vertically stacked, with PSU

MD802DM – Dual 800K drive 40/80 track switchable, horizontally mounted in Monitor Stand, with PSU

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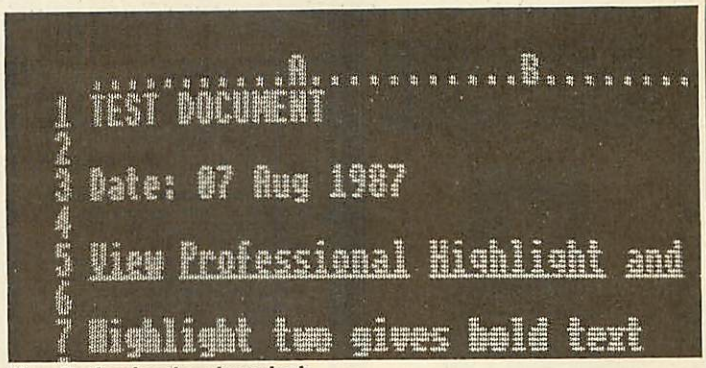
Dealer Enquiries Welcome

Contacts

Cambridge Computer, Sydney House, Sussex Street, Cambridge CB1 1PA. Tel: (0223) 312216.
Camelot Computer Services, 14 South View, Woodley, Stockport, Cheshire SK6 1PD. Tel: 061-494 2253.
Epsilon Software, 45 Wych Hill Park, Woking, Surrey GU22 0HE.
Intersearch Systems, New Hall, The Street, Tendring, Essex CO16 0BL. Tel: (0255) 831011.
Interspan, 108 Mill Road, Cambridge CB1 2BD. Tel: (0223) 316686.
KM Software, 39 Clos des Ormes, Rue Verte, St Lawrence, Jersey, Channel Islands.
Microlink, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. Tel: 061-456 8383.
Permanent Memory Systems, 38 Mount Cameron Drive, East Kilbride G74 2ES. Tel: (3552) 32796.
Raycomp, 46 Frenchs Avenue, Dunstable, Bedfordshire LU6 1BH.
XOB, Balkeerie, Eassie, Forfar, Angus DD8 1SR. Tel: (0307) 84364.

Focus on business in AU

November is our business special with features on:
VIEW PROFESSIONAL: Why use it? Rob MacMillan examines possible applications for Acorn's combined word-processor and spreadsheet.
LONG MACROS: Mailshots can be a problem when using *View*'s macro facility. We explain how you can solve it – using *ViewStore*.
JOE'S JOTTINGS: Getting your micro to do real work is Joe's theme, as he shows you how to build a light meter and a toolbox of useful utilities.
INTER-BASE: Bruce Smith asks whether the wait was worth it.
EPSON LQ-800: Why buy a laser printer when you can get nearly as good quality with a dot matrix? We look at Epson's top notch 24-pin printer.
PLUS there's a review of *Halcien*, an expanded Comms Column and all the regulars.



***View Professional*: a closer look**

Blunderbox

In the *Genie* competition in September, *AU*, there was a mistake in the second column of the table. The value 020B should read 0208. Thanks to Nicholas de Bunsen who spotted it. Also, the September First Byte listing 3 contained an error. Line 160 should be:

```
160 PRINT ~?addr
```

and line 140 should be deleted. Thanks to Cameron Marshall for pointing this out.

Diary dates

The show season is now underway with exhibitions for all types of technology. The fifth Computers in the City event will take place at the Barbican Centre from November 17-19. The exhibition will be looking at the latest developments in computer-based financial systems from over 100 exhibitors.

The National Exhibition Centre in Birmingham plays host to the Design and Technology Exhibition on October 15-17. And the Dutch Big Ben club has it's annual BBC micro show on October 10 in Harderwyk, in the Netherlands.

Copy cost

So many people have been asking for photocopies of past articles that we've decided to streamline the process. In future, all photocopies will cost £2 per article or review, regardless of the number of pages.

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Computers



ARCHIMEDES
HIGH PERFORMANE COMPUTER SYSTEMS

Archimedes systems use the Arthur operating system, a new version of the BBC Micro operationg system. BBC BASIC is replaced by a new extended version, BBC BASIC V. The speed and power of Archimedes allows the programmer to exploit RISC architecture with a range of high level languages for scientific engineering and business uses. In addition to BBC BASIC V, Acornsoft's development languages include C, ISO-Pascal, FORTRAN, Lisp and Prolog. The Acornsoft Software Developers Toolbox provides utilities to simplify program development and debugging; while an extensive Software Developer's Debug Tool facilitates high level leanguage deelopment in C, Pascal or FORTRAN. All Archimedes Systems have a floating point emulator as standard. On the 400 series, complex mathmetical calculations can be further enhanced by the addition of a floating point unit (FPU). All machines have feature: 32 bit RISC technology – BM enhanced style keyboard with 3 button mouse – BBC Micro style operating system (Arthur) – BBC BASIC V – interfaces; printer, serial, monitor, stereo sound – ECONET plug-in option – a variety of podules can be fitted. Archimedes is an open system and its flexibility is achieved by fitting any of the following podules (peripheral modules) via a back plane: hard disk controller (300 series only) – ROM extension board – MIDI music interface – MS-DOS co-processor – SCSI – hardware floating point unit – Ethernet podule.

THE 300 SERIES Consists of two models, Archimedes 305 0.5 Mbyte of RAM and Archimedes 310 with 1 Mbyte of RAM. Both machines have a 512 Kbyte ROM and a 1 Mbyte (unformatted) 3½" disc drive.

THE 400 SERIES Offers increased expansion capabilities. The Archimedes 410 has 1 Mbyte of RAM. 1 Mbyte (unformatted) 3½" disc drive, a hardware floating point unit option, a co-processor bus, a hard disk controller, a four socket back plane, 512 Kbytes of ROM. At the top of the range is Archimedes 440. This machine possesses all the features of the 410 as standard, with the adoption of 4 Mbytes of RAM and a 20 Mbyte hard disk.

305 BASE AKB10	918.85
305 & mono monitor	976.35
305 & colour monitor	1148.85
310 BASE AKB15	1006.25
310 & mono monitor	1063.75
310 & colour monitor	1236.25
410 BASE AKB26	1608.85
410 & mono monitor	1666.35
410 & colour monitor	1838.85
440 BASE AKB20	2643.85
440 & mono monitor	2701.35
440 & colour monitor	2873.85
Archimedes/Master Econet	49.99
0.5 MB RAM	102.35
Floppy disk	143.75
20 Mbyte hard disk & podule (300 only)	573.85
Podule Backplane	40.25
ROM Podule	TBA
I/O Podule	TBA
MIDI add-on to I/O	TBA
A series reference manual	£19.95

MASTER 128

Complete With Internal Software	£399.00
Master Turbo Upgrade	£113.95
Master Econet Module	£46.00
Master ET	£349.00
Master 512 Upgrade	£217.35

The Master 512 upgrade board incorporates the Intel 80186 processor, plus 512K bytes of RAM. Digital Research DOS+, which is copatible with both MS/DOS version 2, and CP/M 86, allows you to run a large proportion of the most useful programs available. A dual 80 track disc drive is required to run programs on the 512. Provided free with 512 upgrade board are three GEM packages, GEM Desk Top, GEM Write, GEM Paint.

UNIVERSAL SECOND PROCESSOR
This allows you to connect co-processor boards designed for the Master Series to your BBC Models B or B+. Fitting a Turbo board boosts the BBC's already rapid performance to twice the speed of the standard processor. Fitting the 512 co-processor converts the BBC micro into a 16 bit machine, opening up new possibilities within the world of MS-DOS and CP/M 86. £86.25

Eprom Cartridge	£14.95
Reference Manual Part I	£14.95
Reference Manual Part 2	£14.95
Acorn Teletext Receiver	£108.00

FILESTORE
Filestore provides shared access to file and printer services on Econet. The filestore consists of two units – a dual 3.5 inch floppy disc unit 1.2 Mbytes of storage (Filestore EO1) which can be expanded with a high performance 20 Mbyte Winchester disk drive unit (Filestore E20).

FILESTORE EO1	£952.00
FILESTORE E20	£829.00

ECONET ACCESSORIES

100m Cable	£89.00
Station Lead Set	£29.00
Econet Starter Kit	£99.00
Econet Bridge	£199.00
Level I Fileserver 40 Track	£99.00
Level 2 Filesaver 80 Track	£235.00
Print Server Eprom	£49.00

BBC Upgrades

64K Upgrade Kit	£39.95
17/70 Upgrade Kit	£49.94
ADFS ROM	£29.95
Disc Upgrade Kit	£65.00
Econet Upgrade Kit	£49.00
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PACKAGE 1
Based on Master 128. The Twillstar All in One Word Processing Package contains a Master 128, View 3.0, Viewsheet, High Res Green Monitor, 800K Dual Drives with PSU, Quendata Daisy Wheel Printer together with a box of Discs, Paper, and all the Cables. £899.00

PACKAGE 2
Based on Master Compact 128. The Twillstar package includes Compact 128, latest version of the View Word processor, single 640K disk drive, monochrome monitor, correspondence quality printer. All connecting cables for above and also 5 disks and some paper. £635.00

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128K *Single 640K Drive* * bundled software*

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MONO SYSTEM £369.00
128K *Single 640K Drive* * Bundled Software* *12" High Res Monochrome Monitor*

COLOUR SYSTEM £499.00
128K *Single 640K Drive* * Bundled Software* *14" Medium Res Colour Monitor*

SPECIFICATIONS: ★ Compatible with Master Series micro subset ★ 128K RAM inc 64K sideways RAM ★ 64K ROM inc 32K MOS, 16K BASIC ★ Up to 4 internal ROM sockets ★ 3.5" 640K formatted disk drive ★ OUTPUTS: Video/RGB/Printer/ Mouse or Joystick ★ Disk drive ★ (optional) Econet ★ Serial ★ 5V power from disk drive module ★ Usual 8 BBC disply modes inc. Mode 7 ★**BUNDLED SOFTWARE:** Pull down menus * Desk top inc. note pad, calculator * VIEW 3.0 * CARD INDEX * Full LOGO * BBC BASIC 4.0 * ADFS + Utils * Welcome suite * Tutorials * (1770 DFS under licence)

2nd DRIVE KIT £113.00

Monitors

MONOCHROME MONITORS

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Phillips BM 7522
Amber Screen £95.00

Phillips BM 7542
Dedicated WD phosphor Screen monitor £95.00

Philips BM 7513
12" Green IBM compatible £120.00

TAXAN
New Taxan Monochrome Screens

Taxan KX117 12" Green Screen P31	£89.00
Taxan KX118 12" Green Screen P39	£99.00
Taxan KX119 12" PUL Amber Screen	£99.00

COLOUR MONITORS

Microvitec 1431 Std Res	£201.25
Microvitec 1451 Med Res	£255.00
Microvitec 1441 Hi Res	£391.00
Microvitec 2030 Cs 20 Std Res	£425.50
Microvitec 1431 AP Std Res	£224.25
Microvitec 1451 Ap Med Res	£293.25

PHILLIPS
New from Phillips

Phillips CM8833
14" CVBS and RGB medium resolution colour monitor. IBM PC compatible. Fast blankup to enable superimposing. Stereo Audio. Ear phone socket. 600 dots x 285 lines vertical £269.00

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12" RGB High resolution colour monitor. Fully compatable with IBM, Apple, BBC and most other Personal Computers. 635 x 312 line resolution. Positive or negative sync input. Text colour switchable to green, amber, white or blue or inverse white. Super high contrast tube. Optional tilt-swivel base (with clock/calendar available). Special introductory offer. £299.00

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MD 400B Single 400K Double Sided	£135.00
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SPECIAL
MD 802D Dual 400K Drives horizontally mounted in a monitor stand to fit both the BBC B and the Master series. £269.00

SOURCE DISK DRIVES

Source SD35 3½" disk drive, single drive £85.00

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Supplied cased complete with cables, powered from computer. Extended two year warranty.

Source SD35S 3½" single drive with P.S.U. £135.00

Source 352S 3½" dual drive with P.S.U. £199.00

Source SD3545S Combo dual 5¼" and 3½" drives with P.S.U. £249.00

Winchester Disk Drives

WINCHESTER DISK DRIVES

Source HD20 Twillstar's 20 Mbyte winchester drive including Acorn DFS ROM complete with P.S.U. £599.00

Source HDP201 Twillstar's 20 Mbyte winchester drive and a 400k double sided floppy drive built in a plyrth to accomodate monitor on the top and the computer underneath. Includes ADFS ROM and P.S.U. £869.00

Source TS10 10 Mbyte tape streamer backup unit with utilities £695.00

Othe size hard disks are available, please call for our latest prises.

Accessories

Taxan KIF 4308 buffer compatible with any Centronics interface printer £149.00
Further 64k upgrade available.

Printer/Computer sharers.

2 – 1	£39.00
6 – 1	£79.00

Serial and Parallel T Switches

Parallel T switch	£67.85
Serial T switch	£67.82

FLOPPY DISKS

Raven 5¼" pack of 10 in a clear library box £15.00

Raven 5¼" rainbow colour pack of 10 in library box £17.00

Raven 3½" *single sided* pack of 10 in library box £18.00

Raven 3½" double sided pack of 10 in library box £25.00

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Trackmaster 5¼" 70 x 5¼" lockable £7.95

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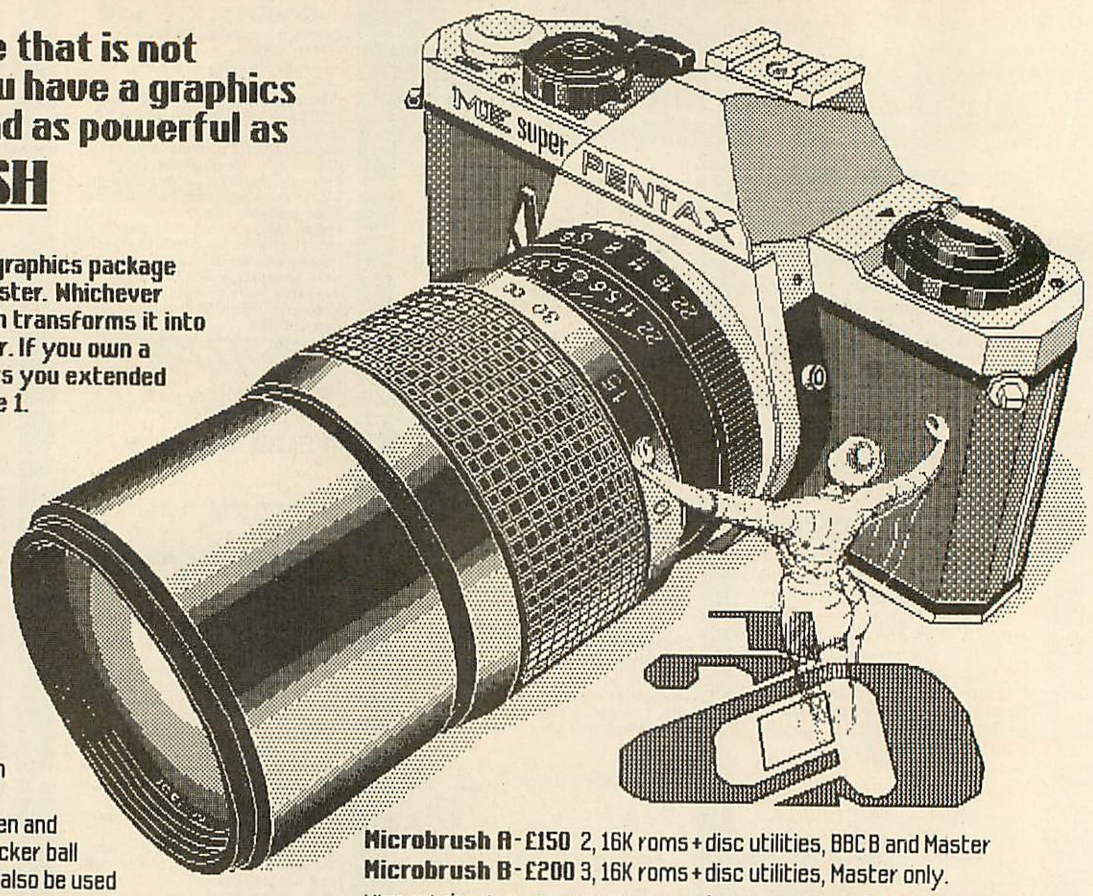
Trackmaster 3½" 40 x 3½" lockable £6.95

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Could you produce this advertisement on your Micro?

There is very little that is not possible when you have a graphics system as fast and as powerful as

MICROBRUSH



Microbrush is a professional graphics package for either the BBC B or the Master. Whichever machine you have, Microbrush transforms it into a powerful graphics computer. If you own a Master then Microbrush offers you extended resolution in mode 0 and mode 1.

Mode 0 - 1216 * 416
Mode 1 - 608 * 416

This whole A4 page was composed as one mode 0 high resolution image using the out-board scroll system, and has a resolution of 1216 * 900 pixels.

Microbrush for the BBC B is comprised of two 16K roms. The Master version contains a third rom. The first two roms can be used in either machine.

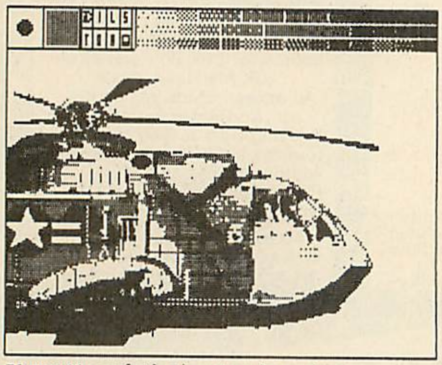
The whole system is menu driven and controlled by the Marconi RB2 tracker ball for speed and precision, but may also be used with either the AMX or the Whigmore mouse. Please note that the tracker ball is not included.

Microbrush A - £150 2, 16K roms + disc utilities, BBC B and Master
Microbrush B - £200 3, 16K roms + disc utilities, Master only.

When ordering please remember to state which system you require, whether you need 40 or 80 track discs and a telephone no. if you have one. Orders and information requests should be sent to - AB Designs, 81 Sutton Common Road, Sutton, Surrey. Phone 01 644 6643

The Painting system

This is just 1 of 33 major graphic systems contained within Microbrush and offers you 42 colours in mode 1 and 42 grey tones in mode 0. New colour palettes can be created with which you can draw lines, sketch, fill, paint in foreground, background, opaque, transparent and combined colour. Add this to a colour rubber which will selectively erase any actual colour and you have a very powerful painting system with more than **1,000,000** possible colours.



Above the painting system in mode 0.

The Ikon Generator

The ikon generator is the main workhorse of the Microbrush system as it is used for both generating and positioning any ikon up to 6 * 3 character blocks. This system is also used by the typesetter and for creating colour palettes, rubbers, paint-brushes and typefaces. Up to 46 ikons can be stored in memory. The scope of the ikon facility is immense as it allows you to transform the Microbrush system into a purpose built design tool that suits your needs.

The Type Setter

With the Microbrush system you will receive 50 proportionally spaced typefaces. The smallest allows you up to 170 characters to the line and if this is not enough then you can design your own typefaces.

The typesetter displays the current font as a scrollable menu allowing you to quickly produce professional typography.

The Screen Editor and the Special Effects Generator

The screen editor is a powerful drag system that allows you to store up to a quarter of the screen in memory. Once stored, images can literally be dragged across the screen, repeated, copied, saved to disc or fed to the special effects generator.

The Special Effects Generator

This is a very versatile system which will automatically outline, inline, shadow, 3D, half-tone, etc. any image held within the screen editor's memory.

The Injector rom

The Injector rom is the second rom in the Microbrush system. This rom contains the drawing functions such as lines, rectangles, circles, ellipses, arcs, rotate, squash, stretch, zoom, halve and quarter screens, plus a whole host of other functions.

This is a very brief description of just 7 of the 33 graphics systems contained within Microbrush. All of the systems are both fast and easy to access. Microbrush also includes a 7*7 character pixel editor and an Epson FX80 screen dump.

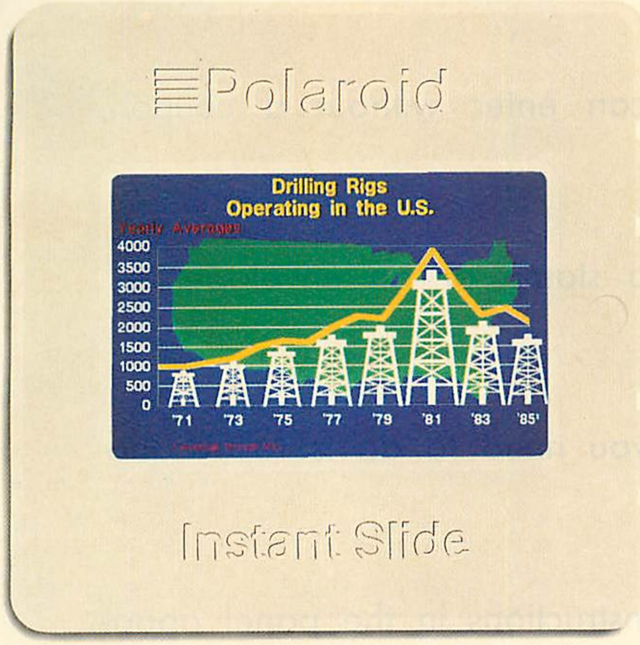
The Master rom

The Master rom takes you into a completely different world of graphics with almost 4 times the resolution in modes 1 and 0, plus 2 on-board graphics screens, 10 rom based typefaces and a 3D generator which is linked to a 10 point perspective system. This allows you to deal with exceptionally complex perspective tasks such as the camera seen above. Also available for the Master rom is an out-board scroll system which allows you to build images with a resolution greater than 1216 * 2000, plus there are high res. screen dumps for both Epson and Integrex printers.

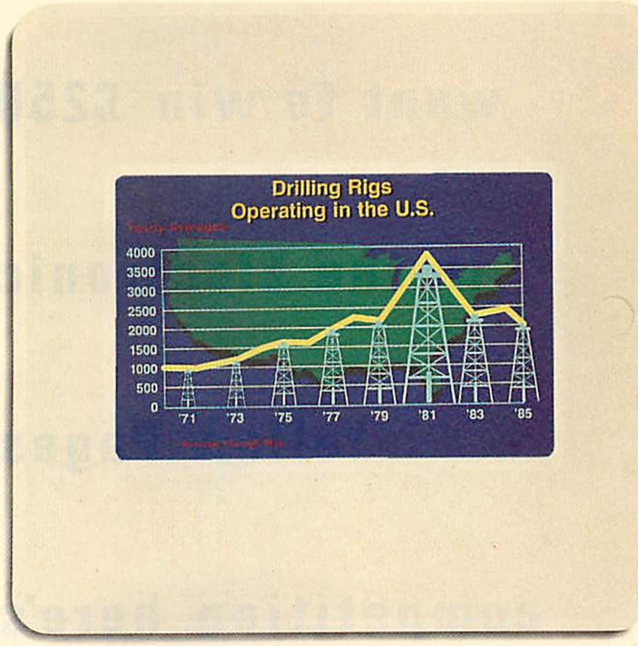
Lastly flick through the pages of this magazine and see how many of the other graphic systems are capable of producing their own advertising.

Extentions to the Microbrush system include - The out-board scroll system - £40, an extended Master rom offering you 14 colours in mode 1 and 4 colours in mode 0 - £85, a typeface editor plus fifteen extra typefaces - £25, the Master rom - £65. No VAT if purchased before September 1.

What's the colour of your money?



80p*



£99

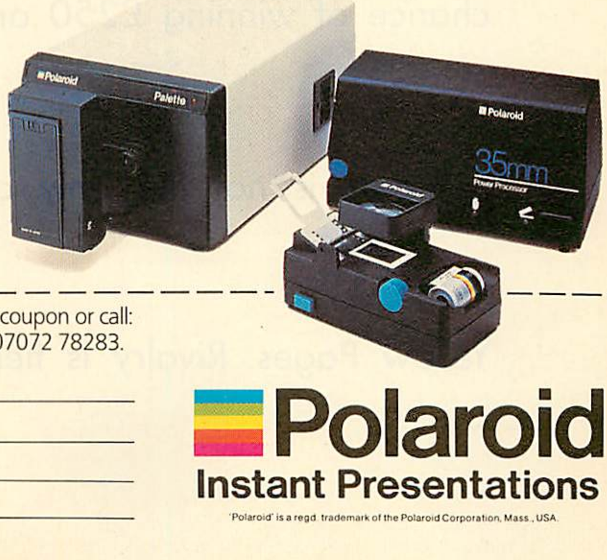
The slide on the left was made by a Polaroid Palette computer image recorder in under half an hour for under a pound. The slide on the right was produced by an outside agency for about a hundred pounds more.

It's an odd world when some people are prepared to pay more money to get less and take longer over it.

With Polaroid's Palette you can produce 35 mm colour slides, overheads and prints at a fraction of the cost and time. You can also update your information right up to the last few minutes before a presentation. And all along, you're in full control of the colour you want. (And also in full control of who exactly will see the information on the slide. This means it's completely confidential.)

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*Based on the cost of origination of twelve slides using Polaroid's new High Contrast Polachrome film.

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(AU/10/87) ______________________ Tel ______________________

Polaroid
Instant Presentations

For all those who want to win £250 in the Electronic Yellow Pages competition, here's the answer.

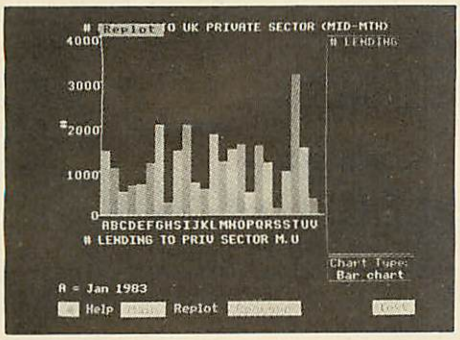
Announcing a competition you can enter without a coupon, a stamp or an envelope. All you need to do is follow the instructions in the panel opposite to programme Electronic Yellow Pages into your 

computer. Answer one simple question, complete the tiebreaker, and you will then stand a chance of winning £250 or one of the many other cash prizes.

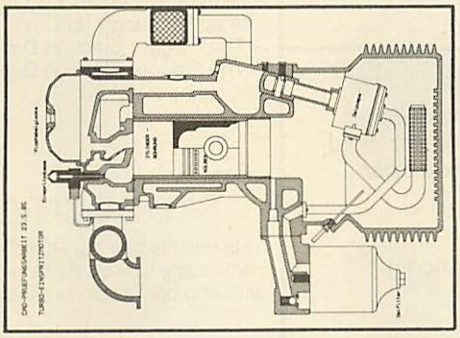
But ours is not the only competition you'll find on Electronic Yellow Pages. Rivalry is fierce between different plumbers, car


ELECTRON & BBC MICRO USER SHOW
Royal Horticultural Hall
Westminster, London SW1

Every PLOTMATE picture tells a story



DOMESDAY
A typical bar chart from the Domesday database. Hard copy is obtainable via the Plotmate BBC Welcome disk.



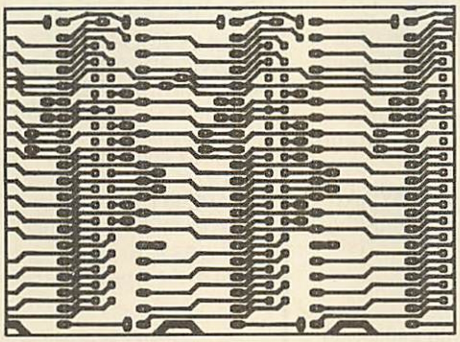
CAD
Example from SUPERDRAFT running on the NIMBUS.



DIGITISING
Map of Europe digitised and edited using LINMAP software.



IMAGE SCANNING
Linscan screen file of 'MONA LISA' incorporated into AMX PAGEMAKER.



PCB DESIGN
Using LINTRACK, a Printed Circuit Board design package.

ESS
20%-30%
DISCOUNTS

ESS
Linear Graphic's unique educational discount scheme.

PLOTMATE is one of the most popular graphics plotters used across the entire curriculum in education.

Sophisticated and inexpensive, Plotmate provides high definition plotted output and high resolution scanned input when used in conjunction with the LINSCAN Image Scanner.

MICRO COMPATIBILITY
Plotmate is compatible with all leading micros including the BBC, NIMBUS, IBM PCs and PC compatibles, such as the AMSTRAD PC1512.

CAD
Plotmate runs from many leading BBC packages including BITSTIK, AMX DESIGN, the REALTIME GRAPHICS SYSTEM and LOGOTRON LOGO. When the on-board graphics language range is extended, Plotmate 'M' models understand commands from HPGL 7475A/7470A industry standard languages enabling compatibility with a wide range of professional third party software including AUTOCAD, AUTOSKETCH, SUPERDRAFT, SCRIBE MODELLER and MICRODRAFT.

PCB DESIGN
LINTRACK is a sophisticated, low cost, CAD package which allows the creation and revision of printed circuit board artwork. BBC, Nimbus, IBM PC and Amstrad PC1512 versions available.

IMAGE SCANNING
The LINSCAN range of image scanners can create image files for most popular Desktop Publishing and Art packages.

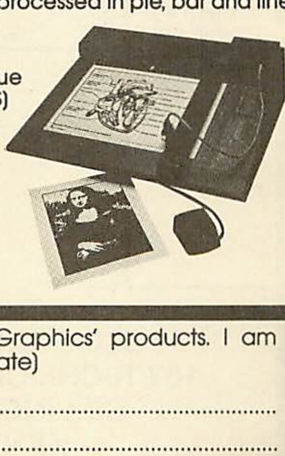
AMX PAGEMAKER, FLEET STREET EDITOR, IMAGE, ARTROOM and ACE can process image files created by Linscan (for the BBC).

ALDUS PAGEMAKER and NEWSPAPER can use image files from Linscan (for the Nimbus).

GEM PAINT, XEROX VENTURA PUBLISHER, and GEM DESKTOP PUBLISHER can utilise image files created by Linscan (for IBM PCs and PC compatibles).

DOMESDAY
All Plotmate Welcome disks allow WRITE Files containing tabular data from the Domesday database to be reprocessed in pie, bar and line chart format on the BBC Master.

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AU10

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. . .Electron User July 87

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★ JOYSTICK command for the SLOGGER Joystick Interface.
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"There is room for improvement in the operating system. No doubt this was the idea behind Expansion 2." Electron User, July 87.

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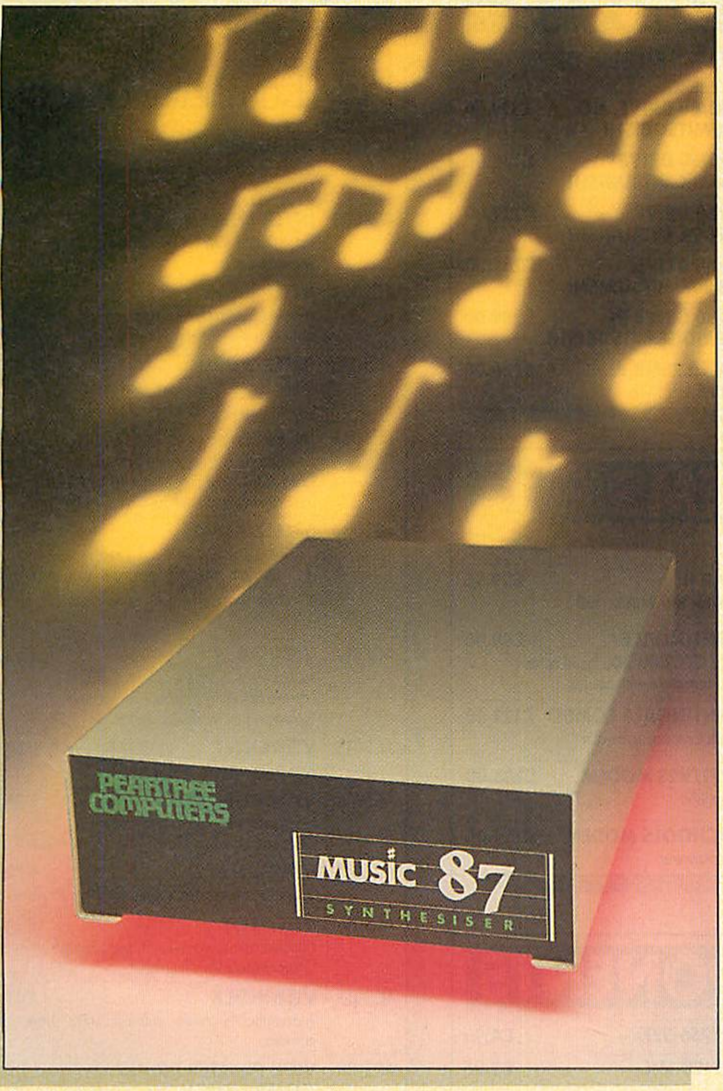
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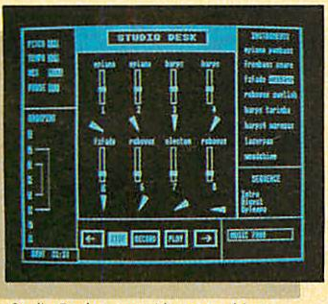
Dear Reader

To make sure that there can be no confusion between Peartree Products and products by other manufacturers we have renamed the Peartree MUSIC 7000 the Peartree MUSIC 87 synthesiser.

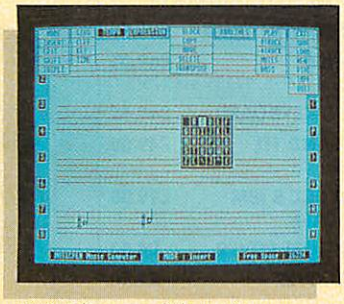
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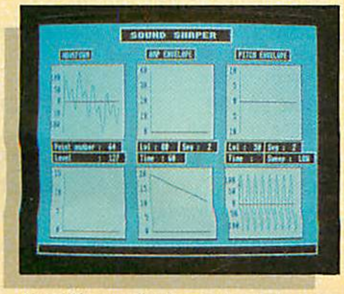
- **6502 2nd processor compatible**
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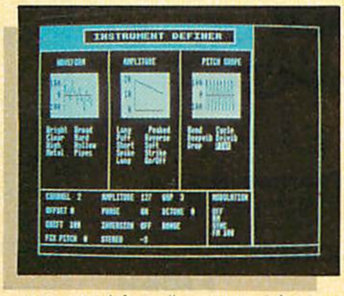
Studio Desk menu with mouse driven record, play, rewind options



Music Editor menu, light pen & mouse driven with complete menu options at top



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ACH034	**ACORN MUSIC 500**	£39.00

ECONET

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The Acorn Music 500 SYNTHESISER

Now available from **Peartree** the Acorn Music 500 for the BBC, BBC B+, Master 128

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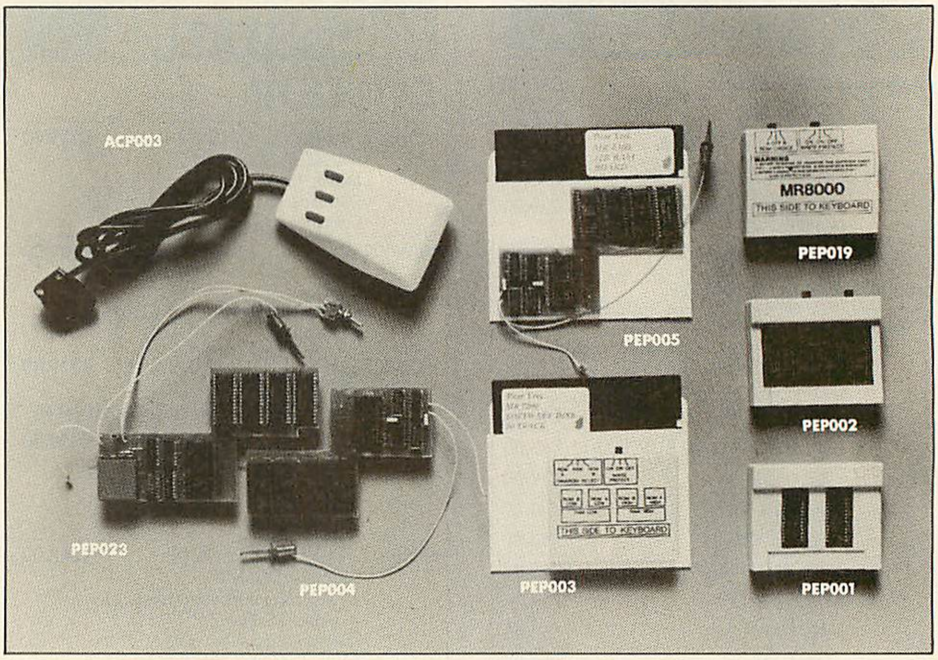
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LETTERS

Write to Letters, Acorn User, 141-143 Drury Lane, London WC2B 5TF

STICKING WITH SOFTWARE

Sir, I refer to your article on page 155 of the July 1987 issue of *Acorn User*, 'Book Publishers Bale Out'.

Although I cannot speak for all the publishers you mention, I would like to suggest that you overstate the case that educational book publishers involved with software publishing are tending to drop their software publishing activities. Certainly here at Cambridge University Press we retain a commitment to educational software publishing, and our rate of new publications in this field is not expected to drop.

It has to be conceded that with the demise of the Microelectronics Education Programme, and the corresponding ending of funding for software development units throughout the country, there is less new educational software currently being developed. It is also true that educational software development is not usually commercially viable if funding comes only from the publisher.

There are, however, alternative sources of development funding. We are involved, for example, in agreements with both the British Council and the British Museum (Natural History) to bring further good educational software onto the UK market.

We plan to continue to publish the highest quality educational software.

T Hardy
Cambridge University Press

PUBLISHERS STAY PUT

Sir, In reply to your report headed 'Book Publishers Bale Out' in July, I can state categorically that Longman Micro Software has no plans to withdraw from the software market. Quite the contrary. We are expanding our list of software titles for both primary and secondary schools on a range of micros: BBC B, Master, Nimbus, IBM and Apple.

We are funding several major developments, some of which will run into the 1990s, and continue to take on further commitments. Our funding of Loughborough University was only one of a number of projects, and it ran its planned course, finishing in 1986.

It is true that we, like all educational software publishers, are concerned about schools' ability to afford quality supported software. But this is nothing new to educational publishers who are accustomed to supplying markets that are badly underfunded.

We believe it is important that Longman, and the other educational publishers who have made a serious commitment to software, stay in the market to provide a degree of stability. While a number of 'smaller houses dedicated to software alone' are still very active, many more have disappeared without trace.

These comments are not intended to be derogatory about 'smaller houses' or 'grass-roots' programmers. The schools market needs a wide range of different types of products from different types of suppliers and we are all helping to increase awareness.

It is important for suppliers and their customers in schools and colleges that we maintain confidence in the whole educational software industry and in its products.

M Spincer
Longman

GEOGRAPHY PROGRAMS LOST

Sir, I have read with interest your article in the June 1987 *Acorn User* entitled 'Maps and More' and am writing to express my concern that you do not refer to any of the pieces of geography software produced by the Computers in the Curriculum Project.

You state: 'A glance through software lists will reveal numerous examples of grid reference programs and yet little in the way of modelling or theme-related simulations.' But a look at the current Longman catalogue will reveal the existence of 15 of the very simulations that you seek. All these run on the BBC.

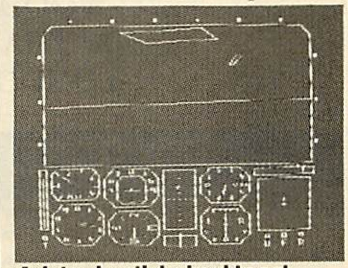
Are you not aware of this rich source of software that is available to you, or is there perhaps some other reason for their omission?

D Watson
Computers in the Curriculum

Our apologies for the omission, but Ms Watson's own book on the subject was mentioned in the article as a valuable source of information.

NO JOY WITH AVIATOR

Sir, Following your recent article on flight simulators, I noticed your 'test pilot' stated that it was easier to use an analogue joystick on Acornsoft's *Aviator* program. However, I have had problems in finding a non-self-centering joystick in the shops.



***Aviator*: joysticks hard to get**

S Almack
North Yorkshire

The original Acorn joysticks are sometimes still obtainable, but if you can't find any, then the centering springs can easily be removed from the Voltmace Delta 3B joystick range.

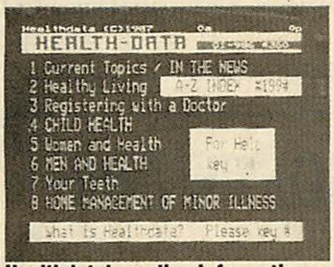
COMMS QUERY

Sir, I found your excellent articles on communications in the July issue very informative but, apart from electronic mail and home banking, they did not tell me much about what else can be done or what information is available. Can I dial up and read the pages of *Encyclopaedia*

Britannica or the books of the reference section of my public library? I have no idea, but if I could, it would certainly make a modem a very economic and worthwhile proposition. If not, the system has a long way to go! Learning how to access pages of Prestel is all very well, but what is in them? Can one seriously expect the home computer user to justify the use of a modem, and the increased telephone bill, in order to buy the odd train ticket? I think not.

J Snoad
London

Communications is an expensive business, and unless you have a real need for the information available 'on-line', then it is hard to justify. But



Healthdata's on-line information

there are all sorts of services available over the phone including electronic mail, credit references, news summaries and bibliography searches.

BODGED BATTERY

Sir, Recently I had to buy a Master 128. When I opened it to fit a ROM I was disgusted to see what must surely be one of the most amateurish pieces of British component design ever.

In a personal computer costing nearly £500 we have a battery back-up unit lying loose inside, consisting of three Duracell alkaline 1.5V batteries very crudely wired together and contained in a heat-wrapped polythene package.

I wonder what Acorn would think if someone sent a photograph of this unit to Amstrad?

E Allchin
Somerset

The Duracell battery pack replaced the original lithium batteries for safety reasons. Acorn originally stated that the Duracells were temporary, and that it would supply a redesigned battery nest.

ARC ADD ON

Sir, At last Acorn leads the field again. Congratulations.

The Archimedes series has enough potential to see Acorn into the 1990s as leaders provided they can market the product properly, and quickly create a sizeable user base.

But what of the Beeb owners who stuck with them through the lean years, perhaps even parting with hard earned cash to upgrade to a Master? Sales of the Master have helped to maintain Acorn through the past 18 months. So what reward is there? Can Acorn do no better than ask us to splash out another £1000 for its new machine?

So come on Acorn! Archimedes is a super machine for those with the money, however many of your supporters have little of this left after spending a small fortune on Beebs, Masters, peripherals and software. Since ARM was developed as a co-processor on a Master it must be feasible to launch an ARM upgrade to provide a reward for the faithful, and a low cost entry point for RISC technology which will maintain the importance of the Master as a worthwhile machine in it's own right.

Acorn needs a large user base for Archimedes quickly before other firms catch up. An ARM co-processor for the Master must be one of the quickest ways to achieve this!

Rev A B McMullon
Lancashire

It is perfectly feasible, and the ARM development system was configured as a second processor. But part of the appeal of the Archimedes is its graphics and sound facilities. A co-processor could supply the processing speed of the ARM chips, but would be limited to the input and output facilities of the BBC B or Master is was connected to.

ARCHIMEDES ASSURANCES

Sir, I need some reassurance about Acorn's intentions with the Archimedes, given its apparent track record with some past products.

■ Can we have Acorn's assurance that it will support all aspects of the new machines?

■ Archimedes, Acorn claims, contains the fastest processor costing less than £1000. In my mind a great deal of confusion exists between MHz & MIPS – not in dictionary terms, but in real time.

I may appear to be looking for faults, but I am already sufficiently impressed with the Archimedes to be seriously considering purchasing a RISC based machine.

G Swain
Middlesex

The 'speed' of the processor is sometimes measured in MHz – a million clock ticks per second. Speed is also measured in MIPS – a million instructions per second. Many 16- or 32-bit computers run at 10 or even 16MHz, but one instruction may take many clock ticks, so 16MHz might mean only 2 MIPS. RISC chips like the ARM do most instructions in only one or very few clock ticks, so an 8MHz Archimedes does about 4MIPS. Of course the real speed is only available to new software written for the Arc; emulation of another machine takes much of the power away. Clearly Acorn will support all parts of the Arc design, as long as there is a market to justify it.

DOTFILL DIFFICULTIES

Sir, I have been having some difficulty with Peter Sandford's assembly language listing for the Dotfills routine, published in the January 1985 issue of *Acorn User* (yellow pages, listing 2, page 112). I was prompted to look up the listings by his more recent articles in this year's January and February issues of the magazine.

After checking the program thoroughly for typing errors, I still get 'Syntax error at line 320' followed by 'Bad program' when I run the program on my BBC Master 128.

D Stewart
London

The listings were published before the advent of the Master series. On a BBC model B, PAGE is set to &1900 if you have a disc drive. The Basic program loads at &1900, and assembles the machine code at &1200, well out of the way. On a Master, PAGE is always set to &E00, so the Basic program loads there and proceeds to assemble the machine code on top of itself. So try this addition to the program, assuming you have called listing 1 'DOTBAS':

```
55 IF PAGE<&1500 THEN
PAGE=&1500:CHAIN"DOTBAS"
```

This loads the program higher up in memory, out of the way of the machine code.

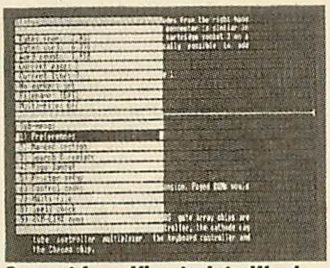
LETTERS

TOO MUCH SPACE

Sir, I have recently acquired Computer Concept's *InterWord* and *SpellMaster* and I regard these as the best so far in the BBC wordprocessing field.

One annoying problem is that *SpellMaster* automatically claims work space when it senses *View*. Good if you are using *View*, not good if your other programs need all your memory to work.

I find that every time I use the computer I have to type in *WORKOFF to disable this facility. Surely it would have



Convert from *View* to *InterWord*

been better to have left it as an option that could have been put in the relevant !BOOT file.

InterWord itself is a very friendly program and I now use it almost exclusively. Is there a simple program or software to change *View* files into *InterWord* compatible ones? When I tried it I lost not only the letter in question but all the files on the disc.

R B Vočadlo
Buckinghamshire

To transfer from *View* to *InterWord*, you have to create an ASCII file containing your text. From *View*, either use the ASCII spooler published in *Acorn User*, July 1986, or this method:

```
LOAD <viewfile>
*SPOOL <asciifile>
SCREEN
*SPOOL
```

Then read the ASCII text into *InterWord* using 'Load text to cursor', menu option 4.

PARISH PRINTING

Sir, I enclose a copy of our magazine – the Biddulph Moor parish magazine – produced using *Stop Press* and *InterWord*. For *InterWord* I use an A5



Rev McGuire's parish magazine

template. The printer is an Epson FX100 and I find the codes for ideal print are 27, 33, 26. This is just right for an A5 sized page.

When all the pages have been printed out, I then photocopy them to 'blacken' them; put them through an electronic scanner and then duplicate. We sell 170 copies and make a profit! Speed is essential in any small regular production and *InterWord* and *Stop Press* are ideal for this.

Rev J McGuire
Staffordshire

BREAKING THE PAGE

Sir, May I make a suggestion to those who bemoan the lack of a page break indicator in *View*.

There is a command PE n, where n is a number. If n is greater than the number of lines remaining on the page, a page eject is performed. For example, if you have a table which takes 12 lines, put the command PE 12 immediately before it. If there are 12 or more lines left on the page, the table will be printed out; if not, the table will be printed on the next page. Similarly PE 2 before each paragraph will ensure that there is never a single line left at the bottom of a page.

I even find this technique useful with *Wordstar*, which does display page breaks. Liberal use of the command means that amendments can be made throughout a documents knowing that page breaks will not come in unwanted places.

J Kitchen
London

PAGING VIEW

Sir, I use the disc version of *View 2.1*, and find it excellent, with the exception of one feature: I cannot control the page eject. If I type a paragraph of text in and proceed to test print it, the page ejects every time. Can page eject be cancelled in *View 2.1*, or do I need an upgraded version of *View*?

R Dean
Leicestershire

***View 2.1* always feeds to the end of the page after it finishes printing. Version 3 allows you to switch this off using the 'PB off' command.**

WRONG LEAP

Sir, Regarding Bob Cornford-Wood's article on the Music 500 and 5000 in the April issue, I have only recently bought a Music 500 and have had my own struggles with Ample, so it is worth pointing out to other neophytes that entering listing 1 in the article is necessary before entering listing 2. The former sets up dummy word definitions to avoid precisely the problems described. I found this out the hard way, ignoring listing 1 and defining words from listing 2 in an order calculated to overcome this, leaving 'play' and 'setup' in particular until last. Line numbers are not essential: I didn't use them.

It helps if commas are added to the ends of some of the lines: line 10 in 'part2D', line 10 in 'part3B', lines 10, 20 and 50 in 'part3C' and line 10 in 'part4C'.

Overall I thought it a very good idea and look forward to more Ample listings.

B Goatly
London

There is a user group for Ample addicts. Contact them at 18 Blackmead, Orton Malbourne, Peterborough, Cambs PE1 0PU – an annual subscription costs £10.

AMPLE EFFORTS

Sir, I write to tell you about an interesting fault in Joe Telford's calendar programs in August's *Acorn User*.

1900 and 2100 are not leap years, but 2000 is, because it is divisible by 400. Joe's programs do not follow this rule and make every centenary year a leap year!

This problem can be corrected as follows. Taking the example of the 'Annual Calendar' (listing 3), the following two lines need to be added to the original program.

```
582 IF (month>2) AND
((yr MOD 100=0) AND ((yr
DIV 100) MOD 4<>0)) THE
N ed=ed-1

632 IF (month=2) AND
((yr MOD 100=0) AND ((yr
DIV 100) MOD 4<>0)) THE
N last=last-1
```

Similar lines are needed in listings 2, 4 and 5 to make them function correctly.

G Rainey
Somerset

TWO INTO ONE

Sir, I have a BBC B, a Cumana single disc drive and an Opus single disc drive. Is there a way to connect the disc drives to make a double drive?

J Briggs
Norfolk

Yes, two single disc drives can be converted to a 'dual' unit. It can be done by changing a few links inside the drives. Your Cumana drive should have come with a manual illustrating the links; you need to change the drive address, by altering the link on the pins labelled '0' to the pins labelled '1'. Then get a dual drive ribbon cable, and remove the 'terminating resistors' from the drive not on the end of the cable.

The simple way is to use a special dual unit connector kit (DUCK) to plug the drives together. You don't need to modify them at all. DUCK costs £17 from Viglen, Trumpers Way, Hanwell, London W7 2QA.

LONG CALL

Sir, Here's a cautionary tale about modems. Beware of a possible clash between the modem software and any extra hardware installed.

I purchased a BT-approved Magic Modem from Dataphone and used it on Prestel. Barely two weeks later, I received a quarterly phone bill for a crushing £173, twice the largest for any quarter in two years.

It dawned on me that the modem probably did not automatically drop the phone line when I logged off, and tests showed this to be the case. My phone meter was totting up the units for most of the final 12 days of the billing period.

I now always jiggle the telephone handset after each shutdown to make sure there's a dialling tone. So be warned!

D Scott
London

Good advice. Dataphone is now aware of a problem with its software and some types of Solidisk sideways RAM, and it is working to rectify the trouble as soon as possible.

ARCHIMEDES IN ENGINEERING

Sir, As an engineer I have long awaited a micro for the home market which offered 32-bit architecture, expansion to 4Mb and high level languages such as Fortran 77 almost as standard. This appears to be promised with the Archimedes.

For the user with more 'professional' applications in mind, the A410 would be an excellent starting point within the Archimedes range. However, the cost will doubtless relegate many to the 300 series systems.

If, as stated in your August edition, there is scope for discount with volume purchases, might there be scope for groups of people to benefit from such reductions?

P Shepherd
Avon

One of the major advantages of the Archimedes for scientific or industrial use is that existing Fortran programs should be usable. The cost of the 410 will be £1610, £600 more than the 310; the hardware differences are the four-slot backplane for podules, the hard disc drive controller and extra circuitry to handle very high resolution monochrome screen modes. Acorn is tight-lipped on further bundled software. As implied in the August article, discounts are available only for volume educational buyers.

PSYCHEBROT THANKS

Sir, I must thank *Acorn User* readers for their generous donations to MIND. Following the article 'Return of the Mandelbrots' in the May issue, and my letter (published in the July edition), I have had over 100 requests for copies of the free *Psychebrot* software.

As most people sent their donations directly to the mental health charity, MIND, I don't know the total collected so far. However, estimating from those who asked me to forward their donation for them, *Psychebrot* had probably raised £500 by the end of July. Obviously I will continue to distribute the *Psychebrot* software for as long as the donations keep rolling in.

Chris P Reynolds
33 Buckingham Road
Tring, Hertfordshire
HP23 4HG

SIDEWAYS WRITINGS

Sir, Can you tell me when *Acorn User* carried an article about sideways RAM, and where can I get back issues?

J Burfoot
Essex

We published an article by Mike Rawlings about using sideways RAM to store data in March 1986, and a second article about storing programs in sideways RAM appeared in September 1986. Back issues cost £1.75, and can be ordered with the form on page 129. Phone orders are taken on (0672) 40825.

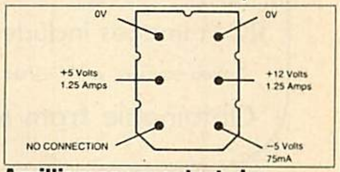
POWERING UP

Sir, I wish to power an electronic circuit using the auxiliary power output underneath my BBC B micro.

Could you print a diagram of the pin connections of this socket?

Simon Spooner
Yorkshire

The auxiliary power output is shown below. If you use this output, take care not to overload the power supply, particularly if your micro has any extras fitted internally.



Auxilliary power output pins

SHIFTING THE FUNCTIONS

Sir, The Article 'Cut Down on Keystrokes' by Graham Bell in the August edition of *Acorn User* should usefully fulfil a need in using *View*. But I am unable on a BBC Master Compact to generate editing functions in the function keys using the codes provided in spite of using *FX228,1. CTRL-Shift-fn generates only the extended character range for ASCII codes over 128. Can Graham Bell's procedures be applied to the Compact?

J B Walls
West Yorkshire

The Compact version of *View* (shown as *View* 05 if you type *ROMS) deals with the CTRL-Shift function keys differently to the versions on other BBC micros. The only way to use the extra functions is to plug in an earlier version of the *View* ROM.

HINTS & TIPS

Martin Phillips' advice on using printer drivers, revamping old micros and converting graphics between modes

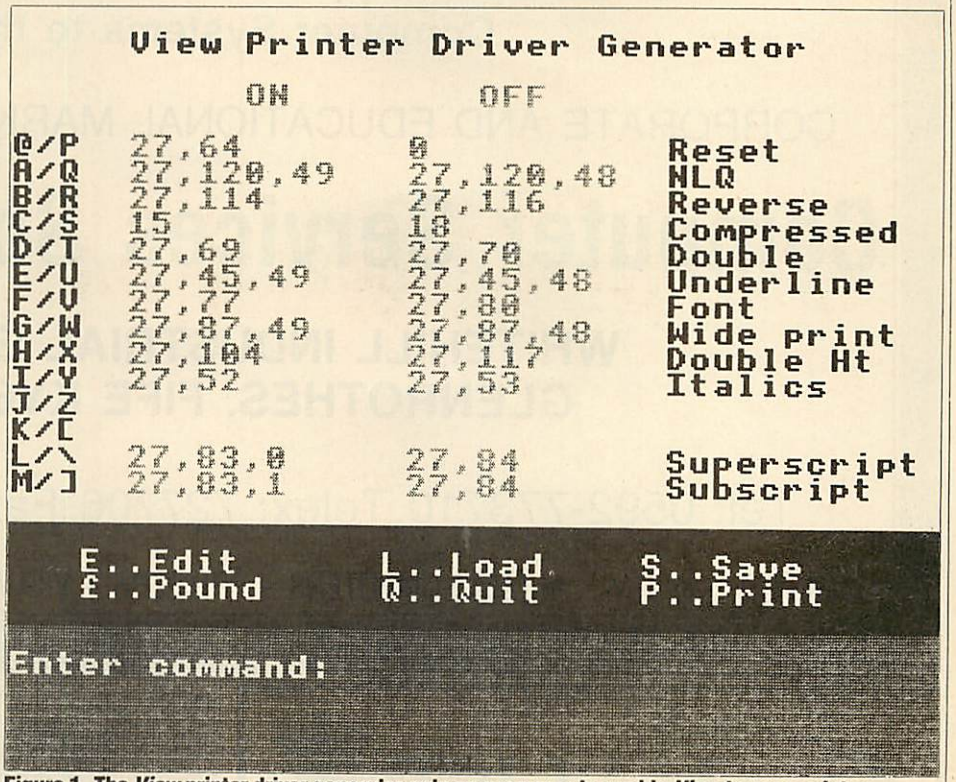
VIEW PRINTER DRIVERS

A printer driver is a short machine code program that tailors a wordprocessor such as *View* for a particular printer. The printer driver then eliminates the need to put printer codes into the text each time an effect like bold is needed, as in the case with *Wordwise*. The printer driver is usually created by a special program called a printer driver generator. Acorn's *View* printer driver generator offers fewer facilities than many modern printers. I needed a printer driver that would be more flexible than the normal Acorn one with its series of Morse code highlights.

A generator produced by George Hill that allows a larger number of type styles was published in *Acorn User* in June 1985. The generator provided a very satisfactory range of printer codes. However, the generator's method of entering printer codes was rather confusing, and the four-character comments, apart from being too small, were not saved with the driver, thereby making later editing difficult.

The new driver generator on the yellow pages creates a driver that works in exactly the same way as George Hill's driver, and readers who have this issue will find it well worth referring back to George's article. The generator program is quite different, however, allowing all the codes to be displayed at once, together with an 11-character comment. When the driver is saved, two files are in fact saved. Apart from the driver, a 'p' file is saved which contains details not only of the driver but also the comments. The codes are entered and displayed in 27,69-type notation which may be more familiar to some than the ESC 'E' notation used by the original.

The generator presents an editing screen (see figure 1). This screen displays both the printer control codes and comments. From this screen it is possible to add or alter any code. Drivers can be loaded, saved and printed out. The ASCII value for the pound sign can also be changed. The printout option prints an exact replica of the editing screen. The program will accept all inputs in either upper or lower case.



View Printer Driver Generator

	ON	OFF	
@/P	27,64	0	Reset
A/Q	27,120,49	27,120,48	NLQ
B/R	27,114	27,116	Reverse
C/S	15	18	Compressed
D/T	27,69	27,70	Double
E/U	27,45,49	27,45,48	Underline
F/V	27,77	27,80	Font
G/W	27,87,49	27,87,48	Wide print
H/X	27,104	27,117	Double Ht
I/Y	27,52	27,53	Italics
J/Z			
K/[			
L/\	27,83,0	27,84	Superscript
M/]	27,83,1	27,84	Subscript

E..Edit L..Load S..Save
£..Pound Q..Quit P..Print

Enter command:

Figure 1. The *View* printer driver generator sets up programs to enable *View* to run a printer

I know many readers have problems with typing in assembler listings. As an assembler routine is needed in this program, I have taken the assembled machine code and put it into DATA statements, which enables a detailed checksum to be included. At the end of each data statement there is a checksum figure, so the program will not only indicate that there is a typing error in the data, but it will also show in which line the error occurs. The use of an editing-screen-type approach in the program does simplify the procedures and makes the program easier to follow, so it is easier to spot any mistakes in the listings.

When loaded into *View* the completed driver occupies page &400. The first &89 bytes (memory locations) of this page are taken up with the machine code given in the DATA statements. Each printer code is allowed eight bytes. The first byte says how long the start code is. The next three bytes are available for the control code to start the printer effect. The fifth byte says how long the cancel code is, and the final three bytes give the effect cancel code.

The driver will allow up to 14 printer effects to be included. The sequence to switch on an effect and also to switch it off again needs to be entered in the printer driver generator. If your printer does not accept the normal ASCII code of 35 for the pound sign, then this must be changed.

The left hand side of the screen shows a series of letters associated with each of the codes. By using the available letters carefully it is possible to employ mnemonic codes for many of the functions: my choice is shown in figure 1.

For Epson-compatible dot matrix printers, the codes shown in the box on the next page may be useful.

To enter these into the driver, first press 'E' to edit. You will then be asked which letter you wish to define. The first code we wish to enter will be the underline code. It makes sense to assign this to be 'U' code. Therefore press either 'E' or 'U'. The generator will then ask for the start code, so type in:

```
27,45,1
```

or its equivalent on your printer. Then it will ask for the stop code, so enter:

```
27,45,0
```

and finally the comment, so enter:

```
underline
```

This will then be displayed on the editing screen. If you have made a mistake it can simply be re-entered, otherwise just add any other codes required. When the driver has been completed, save it to disc by pressing 'S'. It can always be loaded in again and changes made to it. Do note that there are no checks in the listing to ensure that your filename is sensible or that you are not trying to write to a locked file, so be careful or you could cause an error.

To use the driver, load it in from the *View* command screen and type:

```
PRINTER <filename>
```

where <filename> is the name you called the driver when you saved it. Then enter the editing screen of *View*, and at the top of your text add:

```
HT 2 141
```

Press Shift-f8 before the HT and Return after HT, as HT is an edit command. Then the printer codes can be used in your text by first pressing Shift-f5 (highlight 2) followed by the letter assigned to that code.

So to start underlining, include

```
*Utext text text*U
```

when * is highlight 2. Put in one highlight for on, and one for off.

PRINTER CODES

27,87,1	Double-width
27,87,0	Cancel double-width
27,52	Italics
15	Condensed mode
18	Cancel condensed mode
27,80	Pica mode
27,77	Elite mode
27,82,0	American character set
27,82,3	English character set
27,69	Emphasised printing
27,70	Cancel emphasised printing
27,71	Double-strike mode setting
27,72	Cancel double-strike mode
27,45,1	Underline mode
27,45,0	Cancel underline
27,83,0	Superscript on
27,84	Superscript off
27,83,1	Subscript on
27,84	Subscript off
27,64	Initialise printer (reset)

The following codes might also be used by some printers:

27,104	Set double-height
27,117	Cancel double-height
27,114	Set white-on-black print
27,116	Cancel white-on-black
27,120,1	Near letter quality on
27,120,0	Near letter quality off

An important function that should be included in your driver is the reset code. Figure 1 assigns the symbol '@' to this code. The stop character for this code will be a '?'. It is important even with this code to include a stop byte for the driver to function correctly. When using a reset at the start of text always include it twice:

```
*@*@
```

Do make sure that every code is cancelled in the text, otherwise the printer driver will get out of step. The first time the driver meets a highlight it will switch that function on, the second time it will switch it off again, even though it might not be printing the same document.

TAB TIPS

I have recently seen several programs with a line similar to this:

```
PRINT TAB(10,10);"Hello"
```

There is really no need for the semicolon after Tab; it will work perfectly without:

```
PRINT TAB(10,10) "Hello"
```

However, it may be considered good programming practice to include the redundant semicolon.

Where the semicolon is required is when printing numbers. Try the following line:

```
PRINT TAB(10,10) N%
```

Now the number is printed out several spaces to the right of the intended position. This can be overcome in one of two ways. The first one is to change the printing width using @%:

```
@% = 0
```

and then print the number. This prevents Basic trying to 'format' the number into neat columns – which is what causes the extra spaces. The better way is to use a semicolon, which forces the number to be printed directly after the Tab position.

```
PRINT TAB(10,10);N%
```

A semicolon at the end of a line like this:

```
PRINT "Hello";
```

changes the normal action of the PRINT statement, which usually puts a Return at the end of the 'Hello' so that the next text starts printing on a new line. With the semicolon, no Return is printed, so the next text to be printed will start on the same line, directly after the 'Hello':

```
PRINT "Hello ";
PRINT "all"
```

will print

```
Hello all
```

with both words on one line, not like this:

```
Hello
all
```

The other separation characters that you can put into PRINT statements are commas and apostrophes. The apostrophe has the opposite action to a semicolon – it causes an extra Return, so:

```
PRINT "Hello"'"all"
```

prints over two lines like this:

```
Hello
all
```

Commas don't do anything when you print strings, but with numbers they cause the numbers to be divided into columns.

With the full range of separators, it should be possible to include one between each item in a PRINT statement.

£5

ENTERING LISTINGS

A wordprocessor can be used to great advantage when typing in listings. W K Todd from Colchester wins a quick £5 for this tip. If typing in a listing, then ignore line numbers, but put

```
AUTO
```

at the start of the text. When the text is saved, *SPOOL the file rather than the normal SAVE routine. Then *EXEC the file to load in the program. Line numbers will be automatically generated. If a program has to be modified then using a wordprocessor can make such changes much easier. Here the search and replace facility is most useful.

REJUVENATED MICROS

Many BBC computers are getting a little long in the tooth these days. Common problems on older machines are a tendency for the machine not to start up properly when they are switched on, and for the keyboard not to respond as expected. Sometimes there is an easy cure. With the computer switched off and unplugged, remove the top cover by unscrewing the two large screws at the back, and the two similar ones underneath the keyboard. A grey ribbon lead can be seen joining the main circuit board to the keyboard circuit board. Simply unplug this lead at both ends, turn it round, and plug it in again. Very often the problems will then dis-

appear. The reason this seemingly pointless tip works is that the keyboard link connections become somewhat corroded over time, and just removing and reconnecting the link is enough to produce a good contact again. If the fault recurs after a very short time, then obtain a new keyboard connector.

Why should this affect the way the computer switches on? When the computer initialises itself it looks at some link settings which may or may not be present on the keyboard, sending signals along the keyboard connector to do this. If it is not making a good connection then the computer may not get the right signals back to initialise itself correctly.

INPUT PROBLEMS

While writing the printer driver program, I wondered why the input routine would not work correctly. What I had done was to input a string in the form '27,120,1', separated by commas. This string was then 'decoded' into three separate numbers. All that happened was that the first number only was decoded. After a long and detailed look at that part of the program the penny dropped. The problem lay with the INPUT statement, not with the decoding routine! The INPUT statement will not accept commas, so inputting 27,120,1 into the following line:

```
INPUT a$
```

and then typing:

```
PRINT a$
```

will print out just '27'.
Instead try:

```
INPUT LINE a$
```

Now when a $ is printed out, the full string will be printed. INPUT LINE will also accept any leading spaces which have been entered into a string.

£5 SPOOLED GRAPHICS

John Chisholm of Design Dynamics noted our piece in June 1987 *Acorn User* about saving graphics displays in a spooled file. The essence of the idea is that instead of saving a screenfull of graphics, the stream of VDU codes used to draw the display can be saved:

```
*SPOOL <file>
REM draw screen display
*SPOOL
```

The graphics can be reconstituted later using *EXEC to read in the VDU codes.

John writes: 'It's good to see the elegant *SPOOL technique is becoming more widely publicised. But the main benefit of the *SPOOL method was not brought out in the previous article – that you can read back the data in a different screen mode. So a program running in, say, mode 4, could spool its graphical output, then replay it later in mode 0 and gain extra resolution. The original program could even work in mode 7! No graphics would be shown on screen, but the correct VDU codes can be spooled to a file and replayed later in a graphics mode. One caveat – avoid MODE statements in the original program, otherwise they will be spooled too!

'There is one snag with *EXEC, and that is that a Basic program in memory can become corrupted if there is any data in the file in which a number (ASCII characters 48-57) follows a carriage return (ASCII 13). Basic thinks this is a line number. So any Basic program should be saved first. This is because *EXEC pretends that what it reads has been typed at the keyboard.

'A better way to re-display a spooled file is to use a short piece of Basic to read in the data and send it directly to the screen. This way, no program can get corrupted:

```
10 X% = OPENIN "filename"
20 REPEAT
30 VDU BGET# X%
40 UNTIL EOF# X%
50 CLOSE# X%
```

'It would of course be a bit quicker in machine code, and more convenient because it could be run from disc by using a star command.'

John provides a machine code version of the Basic above, but in fact most people have this facility already. This is exactly what most versions of *TYPE do on a BBC model B – the *TYPE command is usually available if you have a DFS. On a Master, *TYPE deals with VDU codes differently, but its place has been taken by the *PRINT command.

So if you have *TYPE or *PRINT on your machine, use it instead of *EXEC when replaying spooled graphics files. If you don't, John's program to create a *PRINT command is on the yellow pages. Type in listing 3 and save it. Running the listing will save a machine code file on disc called 'PRINT'. Now to replay a file called 'PIC', just type *PRINT PIC.

£5 MASTER RAM BANKS

Here's a quickie from Adam Gorst from Warrington. It wins him £5. It is a short program to print out which of the Master's RAM banks are switched in and which are switched out.

```
10 A%=&44
20 R%=(USR &FFF4) MOD &1000 DIV 100
30 FOR C%=0 TO 3
40 PRINT "BANK "; C%+4;
50 D%=2^C%
60 IF (R% AND D%)<>D% THEN PRINT " Paged out" ELSE PRINT " Available"
70 NEXT C%
```

£5 TESTING THE PRINTER

If you try to print something, but your printer isn't connected, or isn't switched on, then the micro can 'hang up'. The Caps Lock and Shift Lock lights come on when this happens. It would be useful to have a way of testing to see if the printer is working. That's what listing 4 on the yellow pages does.

It works by testing the micro's printer buffer – the place where it stores characters temporarily before sending them to the printer – with ADVAL(−4). Try to print something with the printer off, and this buffer begins to fill up. When this happens, you will find that Juliet Wilson's program switches off printing.

It tests to see if the printer is connected by finding out how much space there is in the printer buffer, then sending a few null bytes, and seeing if the space in the buffer has decreased. The one-second wait is necessary to give the printer a chance to take the characters from the buffer.

ADFS HEADACHES

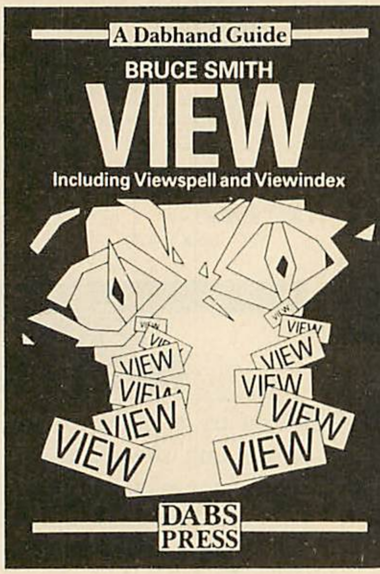
When using the Advanced Disc Filing System that comes as standard on the Master 128 and Compact, there are two error messages that strike at the heart – Broken directory and Bad FS map.

Sometimes it really does mean that your disc is fatally corrupted, and that you have lost all your precious files. But more often than not, the problem can be 'cured' by typing *MOUNT.

VIEW GUIDE

AU OFFER

Bruce Smith's Dabhand book



Bruce Smith has covered all aspects of wordprocessing in this comprehensive guide to *View*.

The 240-page book covers: Command and Edit mode, Rulers and Margins, Saving and Loading text, Boot files, Markers, Formatting and Justification, Search and Replace, Stored Commands, Page layout, Printer Drivers, Macros, Handling Long Documents, Hints and Tips, *View* Manager, Machine Code utilities, *ViewSpell*, *ViewIndex* and OverView, Utility programs, *View* version changes, Quick reference, Printer Control codes and Technical notes. Applicable to the BBC B, B+, Master 128, Compact and Electron.

Please send me:

________ copies of *View A Dabhand Guide* at £12.95 (including p&p)

________ copies of book and 5.25-inch disc at £16.95 (£1.00 Discount)

________ copies of book and 3.5-inch disc at £17.95 (£2.00 Discount)

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Send this coupon with your remittance to Dabhand, Acorn User Merchandising, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF.

FIRST BYTE

THE FIFTH AMENDMENT

Acorn's latest version of Basic for the Archimedes contains new commands to match the power of the machine

Tessie Revivis

We will have a break from machine code this month in the light of the launch of the latest computer to wear the BBC badge – the Archimedes. Last month's issue contained full details of how the micro is put together and of all the new technology it employs – so I thought that this month we could have a look at the new version of Basic supplied with the Archimedes – Basic 5 – and at some of the many new commands which it contains.

Basic 5 is a much enhanced version of the Basic versions 40 and 4 supplied with the Master Compact and Master 128 respectively. The good news is that it is compatible, in that programs written for the Master and BBC micros will run on the Archimedes, provided they are entirely legal and do not try to alter or look for specific memory locations. Programs written on the Archimedes will work on the Master and BBC B micros provided they limit themselves to the Basic commands on those machines – if they use any of the new Archimedes commands then they simply won't work.

Basic control

There are three new sets of Basic control statements to enhance the old REPEAT ... UNTIL and IF... THEN... ELSE structures. The first of these we'll look at is an improvement to the latter – the IF ... THEN... ELSE ... ENDIF structure. Let's first examine the original one with an example program:

```
10 FOR i=0 TO 10
20 IF i<5 THEN PRINT
"Less than five" ELSE PR
INT "Greater than five"
30 NEXT i
```

Line 20 is very long because all the text must be on a single program line. If i is less than five then 'Less than five' will be printed, otherwise it's greater than five and the 'Greater than five' will be printed.

The new command allows these statements to be split over several lines, as shown in the next program:

```
10 FOR i=0 TO 10
20 IF i<5 THEN
30 PRINT "Less than f
ive"
40 REM More lines as
required
50 ELSE
60 PRINT "Greater tha
n five"
70 REM More lines as
required
80 ENDIF
90 NEXT loop
```

Now if i is less than five every line up to the line containing ELSE will be carried out. If i is greater than five, all the lines from the line containing ELSE up until the line containing ENDIF are used instead.

Unlike the original IF... THEN... ELSE, including the THEN part is compulsory. ELSE and ENDIF must also be the first statement on their respective lines.

WHILE... ENDWHILE was unofficially promised for inclusion in the original version of BBC Basic – Basic 1 – but it never appeared. In essence, this is a loop that will continue operating while a particular condition remains true:

```
10 i=0
20 WHILE i<10
30 PRINT "Loop= ";i
40 i=i+1
50 ENDWHILE
```

The loop will continue operating while the value of i remains less than 10.

The WHILE...ENDWHILE loop is virtually the same as the REPEAT... UNTIL loop present in all previous BBC Basics. There is, though, one important difference. In the REPEAT ... UNTIL loop, the lines between the REPEAT and UNTIL are done at least once – the condition is tested at the end of the loop. But the WHILE condition is tested each time the loop begins – so if it fails the first time, then the loop is skipped altogether! So for example, the program below never does line 30:

```
10 a=10 : b=20
20 WHILE a>b
30 VDU 7
40 ENDWHILE
```

The final new control structure looks complicated but is very useful. It is CASE ... OF ... WHEN ... OTHERWISE ... ENDCASE. This originates from the Pascal language and allows you to choose one of a number of alternatives:

```
10 REPEAT
20 CASE GET$ OF
30 WHEN "U","u":PRINT
"Up we go!";
40 WHEN "D","d":PRINT
"Down we go!";
50 WHEN "L","l":PRINT
"Off to the left!";
60 WHEN "R","r":PRINT
"Off to the right!";
70 OTHERWISE PRINT "N
owhere!";
80 ENDCASE
90 UNTIL FALSE
```

In line 20, GET$ waits for a character to be entered at the keyboard, and this forms the CASE ... OF variable. Now that character is compared with each of those in the WHEN statements, and if it is recognised the appropriate string is printed. Two characters are compared in each WHEN statement, but more could have been. The OTHERWISE condition is used if none of the WHENs have been fulfilled, and the whole routine is terminated by the ENDCASE. This is similar to IF ... THEN ... ELSE structure:

```
10 REPEAT
20 flag=0
30 A$=GET$
40 IF A$="U" OR A$="u
" THEN PRINT "Up we go!"
;:flag=1
50 REM Rest here
90 IF flag=0 THEN PRI
NT "Nowhere!";
100 UNTIL FALSE
```

CASE is somewhat more elegant to use and gives the program a more structured feel, without the need for long lines of Basic and extra flag variables.

Graphics

The Archimedes has a staggering 21 screen modes, 18 of which can be displayed on a standard monitor. The other three need an expensive special monitor. A number of new graphics commands have been added to make complex graphics work easier, including LINE, RECTANGLE and CIRCLE.

LINE is the MOVE and DRAW commands combined, into one. For example:

```
10 MOVE 50,50
20 DRAW 900,950
```

can now be written as:

```
10 LINE 50,50,900,950
```

The RECTANGLE command takes just four values – the first two define the bottom left-hand corner of the rectangle, the next two define its height and width – not, note, its co-ordinates.

```
10 RECTANGLE 200,300,
400,100
```

This would plot a rectangle 400 points across and 100 points high, starting from the co-ordinates 200,300. By adding FILL after RECTANGLE it is also possible to fill in the rectangle in the current drawing colour, for example:

```
10 RECTANGLE FILL 200
,300,400,100
```

The CIRCLE and CIRCLE FILL commands work in much the same way, but only three values are required. These define where the centre of the circle is to be, and the radius of the circle, like this:

```
10 CIRCLE 300,300,100
20 CIRCLE FILL 600,60
0,200
```

While no special names are given to them, PLOT commands make it possible for you to draw parallelograms, ellipses, arcs, segments and sectors with ease, just as they do with the versions of Basic used on the Master series micros.

The FILL command may be used by itself to fill any area with the current drawing colour. All you do is specify the co-ordinates which you require the fill to start at, like this:

```
FILL 300,300
```

The fill continues until it reaches a boundary, such as the line surrounding a box.

A command called BY can be added to MOVE, DRAW and POINT to make the equivalent of a PLOT 1 command. The two co-ordinates that follow the BY command are relative co-ordinates. This means that they are not actual screen positions, but are measured from the current position.

```
10 MOVE 200,200
20 POINT BY 100,100
```

would plot a point at a position 100 points up and 100 across from the cursor position set by the MOVE command, that is at an actual screen position of 300,300.

It is also now possible to set the graphics origin of the screen using the ORIGIN command. Ordinarily the origin of the screen, which always has the co-ordinates 0,0, is at the bottom left-hand corner. It could be set to the very centre of the screen with the command ORIGIN 640,512. The following program draws a circle:

```
10 ORIGIN 640,512
20 CIRCLE 0,0,200
```

You can change the origin of the screen as many times as you like without affecting what you have already drawn. ORIGIN is exactly equivalent to the VDU 29 command in the current versions of Basic.

A number of new commands exist to make general programming easier. For example, it has always been a tedious task to add one program to another. This has always involved you having to *SPOOL the second file out to disc or tape, load the original one in, and then *EXEC the second file onto the end of it. At long last there is an APPEND command. You simply specify a filename and that file will be added on to the end of the program which is already loaded so:

```
LOAD "Program1"
APPEND "Program2"
```

joins together programs 1 and 2. The appended program is then renumbered so that it follows on from the first program.

We have covered the process of debugging programs in past instalments of First Byte – and we've seen how useful a list of all the variables used by the program, and the values they hold, can be. The Archimedes has such a command – LVAR. In addition to listing the variables, it will also list all of the function and procedure names which have been used in the program.

Returning values

As many of you will know, it is only possible to pass one value back from a function, and none at all from a procedure. Basic 5, however, allows you to specify RETURN parameters in the function or procedure heading. So, for example:

```
10 n = 10
20 PRINT n
30 PROCprint (n)
40 PRINT n
50 REM other lines
100 DEF PROCprint (RET
URN a)
110 a = 20
120 PRINT a
130 ENDPROC
```

will print the numbers 10, 20 and 20. 'n' is given the value of 10 and then passed to PROCprint in 'a'. 'a' is then given the value of 20 which is passed back into 'n' when the ENDPROC is executed.

This may just appear to be a substitute for using functions, but it is now possible to return more than one numeric or string variable, or indeed a combination of both.

Machine code

Over the past months we have been writing many machine code programs. As you are probably aware, the Archimedes has a different microprocessor to that used on the BBC B, B+ and Master series, Acorn's own RISC chip instead of the 6502 chip. And, of course, Basic 5 has a RISC assembler for the new chip. But it can run 6502 machine code programs! How? Simply load in and then run a special program called an emulator module which is supplied on the Welcome disc. This will then emulate the 6502 microprocessor so that 6502 machine code programs act as though they were running on their own processor.

The emulation doesn't stop there – you can even write new 6502 programs using the emulator's own Basic.

And finally

If you do plan to invest in an Archimedes and are worried about the new commands – don't be. There's even a HELP command which will give you guidance on any command you care to name!

We have only touched on some of the more important of the new facilities from the point of view of a Basic programmer. They all help to make BBC Basic 5 one of the best versions of Basic around today – certainly it is the fastest.

ACORN FORUM

David Atherton discovers readers' ways of working without line numbers, and simulating Basic @ and the code key system

£10
INITIALISING ROM IMAGES

Quentin Stafford-Fraser from Ware keeps his ROMs on disc as 'images'. He's spotted the 'I' suffix on the Master Compact, which is not available on earlier machines. Quentin has written listing 1 on the yellow pages, which initialises any ROM images loaded into sideways RAM. They can be used straight away, without pressing CTRL-Break. Although written for the Master and B+, it should work with most model B sideways RAM too.

The program works by scanning each ROM slot, using Osrdrm (read a byte from paged ROM), and copying the type byte at &8006 into the ROM table which is usually at &2A1 – this address is read by Osbyte 170. Any slot that does not contain a ROM must have a table entry of zero, so the program also checks that the data is valid ROM data by reading the 'C' of the copyright symbol, which is found at (&8002+?&8007). If a 'C' is not found, the type byte is not transferred. The net effect is to install any new ROMs loaded.

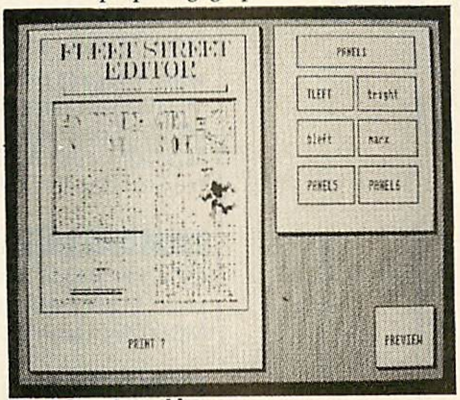
To finish, service call &27 is issued. On the Master series, this is used to inform the ROMs of a reset, so they claim any work space they need. On the model B or B+ this has no effect. The program shouldn't be used on a B or B+ for ROMs which claim work space, such as filing systems.

Listing 1 creates a machine code file called 'ROMINIT'. You should load your ROM using *SRLOAD, or use the utility provided with the sideways RAM – *RLOAD if you have UserRAM. Then type *ROMINIT. Keep the program on the same disc as your ROM images.

£5
FLEET STREET EDITOR TIP

Forum regular Jonathan Temple says that the Graphics Studio section of *Fleet Street Editor* is a formidable piece of software, and it gives access to the fonts and clip art library too. However, it can't normally be used as a general purpose art utility – the graphics cannot be loaded into other graphics packages. To remedy this, Jonathan has worked out how the *Fleet Street* graphics files are stored and has produced a decoder program.

When preparing graphics in the Studio,



***Fleet Street* graphics**

make the frame around them as large as possible without an 'area off panel' error. The frame should enclose almost all the drawing panel. Then save your efforts. Go back to Basic, and run the decoder program, listing 2 on the yellow pages. Enter the name of the graphics file, and the *Fleet Street* screen will be loaded. You can now *SAVE the screen to disc as usual:

```
*SAVE <name> 5800 7FFF
```

This mode 4 screen can then be treated like any other.

£10
CODE KEY SIMULATOR

Ian Goldby from Broxbourne has sent me an interesting program which offers to model B and Master 128 owners the 'code key' systems found on the Compact. The code key allows you to type all 256 ASCII codes from the keyboard, instead of just the first 127 as is normally the case. There is an extra key on the Compact keyboard where the @ key is found on the earlier machines – marked with two squares. If you press CTRL-Shift and the code key, nothing happens! But the next letter typed has 128 added to its value. So to get the character 130, to generate a green text code in mode 7, a Compact user would use the combination CTRL-Shift-Code, then release all keys, then type CTRL-B. This last keypress normally generates ASCII 2, so the result is 2+128 or 130.

The feature is not just for generating mode 7 codes. Some text editors (*Edit* for example) allow the entry of codes above 127, and it is useful in many communications programs, which need eight-bit code sent to the remote computer.

Ian's program works by defining the Tab key to work as a code key. When you run the program, the Rdchv vector is redirected to point to Ian's code – that means that every time the operating system waits for a key press, Ian's routine can see what it is. If it's a Tab, a flag is set at 'char'. All other codes EOR themselves with the flag – &80 signifies the flag is set, and so codes are automatically altered when the flag is set but not when it's clear. Listing 3 on the yellow pages generates a machine code file 'TABCODE'. *RUN this to generate code 130, press Tab and then CTRL-B.

Unlike the Compact, the addition of 128 remains in force for every character typed until you press Tab again. When the routine is active, the cassette motor light comes on on a model B. Master users will have to rely on the audible click from the motor relay.

£10
SIMULATING BASIC @

Basic 4 on the Master Series can be started by using '*BASIC @'. The @ makes Basic take text in memory and convert it to a tokenised Basic program. The main use for *BASIC @ is to allow Basic and *Edit* (the Master text editor) to work together, but it could also be used by other utilities.

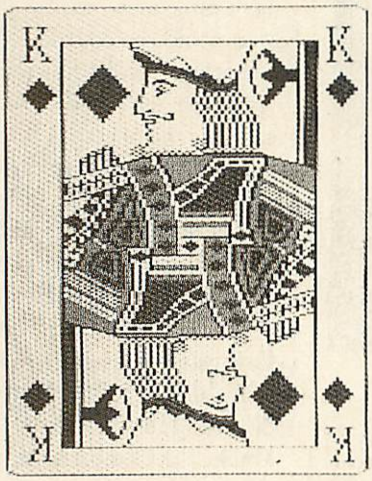
David Spencer's program, listing 4, provides *BASIC @ for BBC Basic versions 1, 2 and 3. The program is slightly different from the Master version, and the memory address of the text should be added after the '@'. If no address is given, the text is read from the address pointed to by locations &00 and &01 in zero page.

The way the routine works is by interception of Osword 0, the routine used to input lines of text. Basic uses this call to allow you to type in programs, and David re-directs the call to point to his own routine. This ignores the keyboard and reads in text from memory. Basic thinks this is text being typed, and turns it into a program. The screen is disabled, so you

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don't see anything. When the routine finds 256 characters without a carriage return, it assumes it has found all the program text.

David has made the program Tube-compatible. If it detects an active 6502 second processor, some code is actually copied across the Tube and run from the second processor, as this is where the ASCII text will be.

Running the listing will generate a file called 'BASIC'. Place your text file in a known area of memory, and type:

```
*/BASIC @<addr>
```

where ‹addr› is the start of the text. *View*, for example, stores text from OSHWM+&100, so on a standard disc-based model B, you can type in a program using *View*, then type */BASIC @1A00, and the program will be automatically transferred into Basic.

RESTORE YOUR SCREEN

It is not generally known that monitor screens have a limited life. After some time, perhaps a couple of years of hard use, you might find that some marks begin to appear on the screen, literally burnt in to the coating on the back of the glass. This happens because the monitor is often left showing the same, unchanging picture. It doesn't happen to televisions to the same extent, because they display a moving picture most of the time.

The process is accelerated by keeping the brightness up too high, and particularly by leaving the monitor and computer on while they aren't being used. But you may not want to switch off the equipment – electronic devices are less reliable if they are switched on and off too frequently.

David Acton has devised a short utility to blank the screen when you leave the micro doing nothing, in order to prevent this type of screen marking. It works by waiting for you to press keys. If you do, nothing happens. But if no key is pressed for five minutes, then the screen is blanked. Don't worry, the display is restored as soon as a key is pressed.

Type in listing 5 on the yellow pages, save it in a file called 'Autosrc', and run it. If you have typed it in correctly, then it saves a machine code file called 'Autooff'. If you have made a mistake typing in the assembly language, then the program ends with the message 'Assembler error', so check the listing. Once it is all working, and you have saved the 'Autooff' file, type *AUTOOFF, then go away. The screen is blanked automatically if you don't touch the keys for a few minutes, leaving only the flashing cursor. And when you come back and type anything, the screen display reappears immediately. The program keeps on working until you press Break or switch the whole computer off.

'Autooff' uses memory at &A00, which is normally used when loading files from cassette. If you use cassettes, then it is best to use a different version of 'Autooff'. Type in the listing, then change the A00 in lines 80 and 120 to C00, and change line 1370 to:

```
IF J%=&4D27 THEN =TRUE
```

Now run the new version, and a different 'Autooff' file will be created. This uses memory at &C00 instead.

You will have to type *RUN AUTOOFF to use the utility from tape, and it won't work together with any other program that changes the user-defined characters with VDU23 commands.

MASTER EDIT TIP

I often write Basic programs on my Master 128 using *Edit*, and I find that having line numbers in the listing is messy. I keep having to leave *Edit* to renumber the program. A better way by far is to work without line numbers at all. You can add them back when you return to Basic. This is very easy – start with your Basic program, then type EDIT to put it into the editor. Leave the cursor at the top of the screen and type a single carriage return. Then press f5 for global replace, and type:

```
$...../$
```

at the prompt. This means replace 'carriage return and the next five characters' with just 'carriage return'. As the first five characters of each line are spaces or line numbers, this action neatly strips them all out leaving just the program text.

To put the line numbers back when you have finished, go to the top of the program and insert the word AUTO on a line of its own. Don't exit to Basic – instead save the file with f3, and type f1 then *BASIC. The AUTO command will supply the line numbers when the program is loaded.

A further tip connected to this concerns the stripping of leading spaces between line numbers and program text. The quickest way to get rid of these, especially on a long program, is to convert the program to an ASCII *Edit* save, then by using f3 as above. Go back to Basic, set LISTO 1, and then *EXEC the program back in. Reset LISTO 0 and LIST the program, and you'll find no spaces between line numbers and text. When LISTO is set to anything except zero, any spaces at the beginning of a program line are ignored.

Now type NEW, then *EXEC the program back in – if the text file saved from *Edit* was called 'Txtfile', then:

```
*EXEC Txtfile
```

You can also include comments in the file which don't appear in the Basic program. Put them above AUTO and start each comment line with *|.

£5 TIME STAMPING TIP

Bill Vaughan has a simple tip for Master 128 owners. Inserting the following line into your programs:

```
10 OSCLI "TITLE "+MID
$(TIME$,5,2)+MID$(TIME$,
8,3)+MID$(TIME$,14,2)+MI
D$(TIME$,16,3)+MID$(TIME
$,20,2)
```

will *TITLE the disc with the current time and date every time the program is run. Bill finds that he is often strangely unable to remember filenames, but can recall the time and date he last used a program. Cataloguing his discs shows when they were last used. This tip works for both DFS and ADFS discs. You won't, of course, need it on the Archimedes, as the new ADFS time-stamps files anyway.

That's all for this month. Keep those tips coming in – but please glance through the last few issues if you have them to make sure we haven't covered the item before. Also keep them short – if a listing won't fit on one sheet of paper in Basic or two sheets for assembler, then it's probably too long. With the Archimedes, we'll have to start slowly – it's going to be a while before there is a large audience. What would be nice is if there are any neat features of the Archimedes which could be implemented on the model B or Master without too much trouble.

See page 113 for further details of the Acorn Forum listings. Send your tips to Acorn User, Redwood Publishing, 141-3 Drury Lane, London W2B 5TF.

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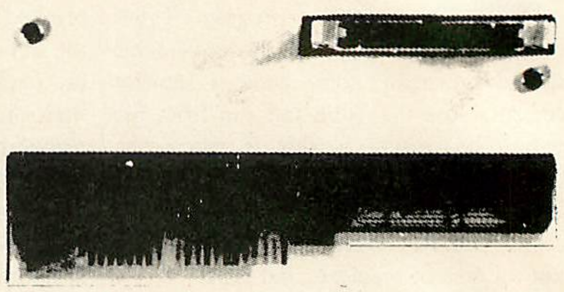
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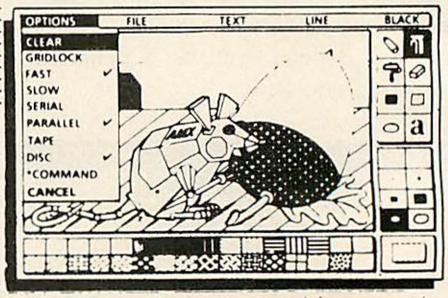
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"DISC DRIVE COMPATIBILITY AT LONG LAST" (Electron User June '86) this sums up AP4 & ACP's approach to producing products. AP4 is a fully ACORN compatible disc I/face & will accept any standard drive inc. PSU, runs 1770 DFS (as fitted in the B+ & Master), keeps page &Eøø, utils in ROM & provides a spare rom socket. "ACP's PLUS 4 comes out on top. I can recommend it to anyone" (E.U. June '86)
AP4 should be considered the standard interface for the Electron (AU July '86)
AP4 100 £199.00 (inc VAT & Securicor delivery)
AP4 400 £299.00 (inc VAT & Sucuricor delivery)

ADVANCED PLUS 5
(09)/E + 1/ £66.70
A triple interface cartridge providing
1) a TUBE i/face allowing a second processor to be connected, increasing BOTH speed & memory (PAGE &8øø HIMEM &8øøø in all modes)
2) a 1 MHz BUS for control applications & prommers
3) the USER PORT for mouse and graphic devices
Also contains 2/3 ROM sockets and on board operating software for 2nd processor.

ADVANCED 1770 DFS
3 versions ADM/C(11) – ADB(12)
ADE (13) £34.50
ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is probably the fastest & most powerful disc filing system your computer could have. With the ability to operate in double density occupying both sides of a disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC
(16K EPROM + comprehensive manual)

ADVANCED ELECTRON DFS Eøø
(14) /E+ASR/ £19.99
An alternative to our AED(05) for Plus 3 and ASR users. This optional alternative DFS is designed for use in Sideways RAM (ASR) and allows the user to operate a disc filing system &Eøø when using the Plus 3 (in ADFS page would normally be &1Døø). The DFS is simply loaded using the software supplied with the ASR from disc. (optional upgrade for existing AED users £9.50 on return of original EPROM) (3½" ADFS disc + manual)

NEW EXCLUSIVE PRODUCT ELECTRON ASSEMBLY LANGUAGE
Book by Bruce Smith £2.95 (144)
Software for above book on 3.5" A.D.F.S £3.50 (145) or 5.25" D.F.S. £2.50 (146)

'OTHER PRODUCTS & SPECIAL OFFERS'

VIEW cartridge	(101) /E+1/	£ 14.95
Vsheet "	(102) /E+1/	£ 14.95
VIEW & SHEET	(119) /E+1/	£ 22.00
LISP cartridge	(103) /E+1/	£ 9.99
E/Adv User Guide	(104) /E/	£ 3.95
LOGO cartridge	(106) /E/	£ 29.95
PASCAL cartridge	(107) /E/	£ 29.95
VIEW pack BBC	(118) /B/	£ 49.00
AP4 100	(140) /E+1/	£199.00
AP4 400	(141) /E+1/	£229.00
AP5 + MOUSE Pckage	(143) /E+1/	£125.00
3½" discs in 1/box	(120) /M/B/E/	£24.00
5¼" discs ds/dd"	(121) /M/B/E/	£12.99
5¼ discs ss/sd	(122) /M/B/E/	£ 8.99
3½" disc drives		£129.00
5¼" disc drives		£149.00
2nd Drive Adaptor	(130) /E+3/	£ 7.95
Compact 2nd Drive Adaptor	(144)/C/	£14.95
3½" library box 10	(124)	£ 2.95
16K EPROMS	(131)	£ 3.75
VIEWSTORE	(117) /M/B/(e)	£57.95
VIEWPLOT	(142) /M/B	£26.95
ACORN 1770 upgrade		£48.95

Equipment codes /M/ = Master /B/ = BBC /E/ = Electron /E+1/ = Electron + Plus 1 /C/ = Compact

Please send order to
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(mail order only)
All our prices include UK delivery & VAT

(in event of any query - please include your tel. no.)

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POSTCODE ....
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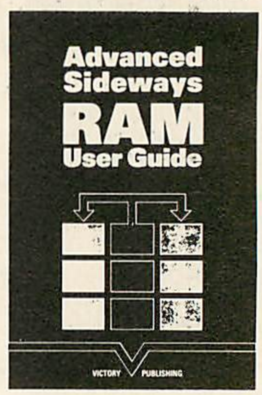
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Exp date .... (A29)

RAM GUIDE

A U O F F E R

Bruce Smith's RAM User Guide



Sideways RAM is a technique central to the new Acorn Master series of computers. It allows you to load in software from disc or cassette which is designed to behave as if it were part of the machine, and is always on tap to the user.

Ex-*Acorn User* Technical Editor Bruce Smith's book, *Advanced Sideways RAM User Guide* for the Master and BBC computers will allow you to exploit sideways RAM to the full. The book is backed up with tried and tested software for you to use straight away or adapt to your needs (and for those with less nimble fingers it's available on disc).

Features of the book include: 25 programs and routines demonstrating the use of sideways RAM; compatibility tables and conversion notes for the BBC micro and Electron; writing languages and interpreters; extensive indexing; and there's even a ROM formatter developed by Bruce Smith for use on commercial software, ready for you to type in and use.

Please send me_____ copy/copies of the Advanced Sideways RAM User Guide by Bruce Smith at £9.95 (including postage)

Please send me____ copy/copies of the book and the Master software* disc at the special price of £14.95 (normal price £17.90)

Please send me____ copy/copies of the book and the BBC micro software* at the special price of £14.95 (normal price £17.90)

*Discs can be read on 40 and 80 track drives

I enclose my sterling cheque/postal order for £_____ payable to Victory Publishing (European readers please add £2 per item for p+p, £5 for airmail)

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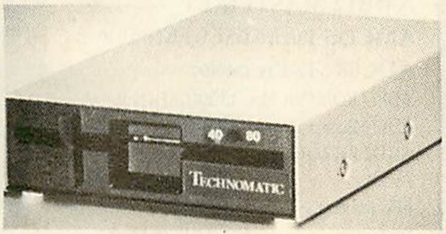
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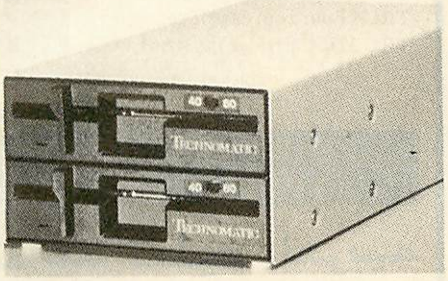
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TECHNOMATIC DISC DRIVES



TS 400



PD 800

A range of high quality high performance drives to meet the needs of all BBC Micro Users.
All drives fitted with high quality, slim line Japanese drive mechanism and necessary cables.
*All drives are fitted with high quality slim line ultra low power mechanisms capable of single and double density operation and offering fast track access and head setting times. Our confidence in their quality enables us to offer a two year warranty on these mechanisms without any extra charge.
*5.25" floppy drives are fitted with 40/80 track switches as standard at no extra cost. The switches are located in the front and clearly marked to indicate the status at a glance.
*The mechanisms are set inside attractively styled, sturdy metal casings painted in BBC beige colour.
*All drives fitted with all necessary leads and are ready for operation on unpacking. The drives with the mains power supply are supplied with a mains lead fitted with suitably fused 13A moulded plug.

5.25" Single Drives 40/80 switchable:

TS400 400K/640K **£105 (b)**

PS400 400K/640K with integral mains power supply **£115 (b)**

5.25" Dual Drives 40/80 switchable:

TD800 800K/128OK **£185 (a)**

PD800 800K/1280K with integral mains power supply **£209 (a)**

PD800P 800K/1280K with integral mainspower supply and monitor stand **£229 (a)**

3.5" 80T DS Drives:

TS351 single 400K/640K OFFER **£75 (b)**

PS351 single 400K/640K with integral mains power supply **£99 (b)**

TD352 Dual 800K/1280K **£134 (b)**

PD352 Dual 800K/1280K with integral mains power supply **£169 (b)**

PD853 Combo Dual 5.25"/3.5" drive with psu. **£209 (a)**

DISC DRIVE MULTIPLEXER

TDM2
Dual Unit: 2 computers/one drive unit **£75 (b)**

TDM4
Quad Unit: 4 computers/one drive unit **£135 (b)**

TECHNOMATIC WINCHESTERS

Technomatic offer one of the most popular Winchester drives for the BBC Micro. We will include a front end utility for the BBC Master at no extra charge. Complete contents of the drive are displayed in icon format indicating the type of data in each file. Any file can be loaded by formatting the cursor to its icon.

P20HD TECHNOMATIC 20 Mbyte Winchester Drive **£499 (a)**

P40HD TECHNOMATIC 40 Mbyte Winchester Drive with Acorn ADFS ROM **£749 (a)**

P204HP TECHNOMATIC 20 Mbyte Winchester and a 80T DS floppy Drive built in a monitor stand. Includes ADFS Rom. **£769 (a)**

P2041HT As P204HP but also with a 10 Mbyte tape streamer backup unit and backup utilities. Includes ADFS Rom. **£1295 (a)**

TS10 10 Mbyte Tape Streamer Backup unit with utilities. **£599 (a)**

TFC10 10 Mbyte Pre-formatted Cartridge for use with P2041HT and TS10. **£19 (d)**

Special adaptor for S.J. File Server **£28 (d)**

Enquire for larger capacity Winchesters.
These Winchesters are compatible with the S.J. File Server.

WINCHESTER
Drive Multiplexer
TWM2 for two computers. **£99 (b)**
TWM4 for four Computers. **£159 (b)**

3M FLOPPY DISCS

New low prices plus Winter Olympic Competition

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744	40T SS DD	**£8.50 (d)**
745	40T DS DD	**£10.50 (d)**
746	80T SS DD	**£11.50 (d)**
747	80T DS DD	**£13.25 (d)**

(Add £1 for library case packing)

3.5" Discs in packs of 10

80T	SS DD	**£15 (d)**
80T	DS DD	**£19.50 (d)**

Thousands of instant prizes to be won with 3M Discs. A draw for a trip to the Winter Olympics.
Five 2nd Prizes of £1000 of recording instructs.



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50 5.25" 40 T single sided discs with sleeves in lockable box. **£25 (b)**

50 5.25" 80 T double sided discs with sleeves in lockable box. **£36 (b)**

50 3.5" 80 T double sided discs with sleeves in lockable box. **£60 (b)**

FLOPPICLENE DRIVE HEAD CLEANING KIT

5.25" Kit with 20 disposable discs **£12.50 (d)**

3.5" Kit with 20 disposable discs **£14.00 (d)**

DISC STORAGE BOXES

DB340 Lockable 40 x 3.5" **£8.50 (c)**

DB550 Lockable 50 x 5.25" **£9.00 (c)**

DB570 Lockable 70 x 5.25" **£11.00 (c)**

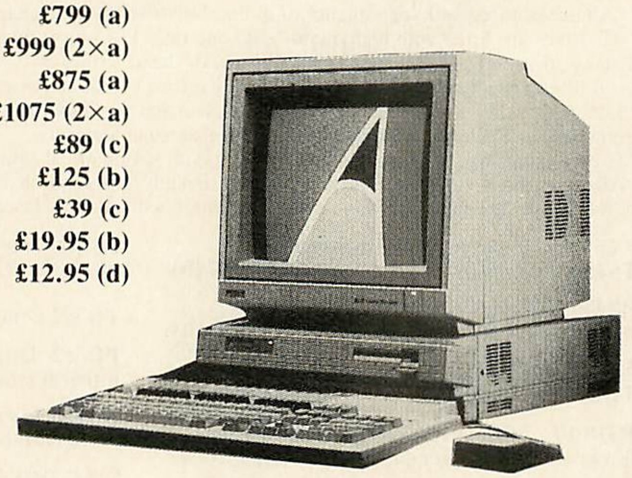
DB5100 Lockable 100 x 5.25" **£13.00 (c)**

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305 Edgware Road, London W2 Tel: 01-723 0233

ARCHIMEDES

Archimedes 305 Basic	£799 (a)
Archimedes 305 Colour	£999 (2×a)
Archimedes 310 Basic	£875 (a)
Archimedes 310 Colour	£1075 (2×a)
0.5Mb upgrade for 305	£89 (c)
2nd Floppy Drive	£125 (b)
Podule Backplane	£39 (c)
Archimedes Ref. Manual	£19.95 (b)
ARM Assy Lang Prog.	£12.95 (d)



(Please enquire about the availability of some of the above packages)

BBC MASTER COMPACT

See page 6 for free bundled software

SYSTEM 1
128K, Single 640K Drive & bundled software. **£329 (a)**

SYSTEM 2
System 1 with a 12″ Hi Res Monochrome Monitor. **£369 (a)**

SYSTEM 3
System 1 with a 14″ Med Res RGB Monitor. **£509 (a)**

Second Drive Kit.	£99 (c)
Serial Kit.	£29 (d)
T.V. Modulator	£29 (d)
Extension cable for external 5.25″ 80T Drive .	£12.50 (d)
Mertec Adaptor (Upgrades to almost master level) NEW	£35 (c)

FILE STORE

Acorn's new file server system

Filestore E01	£828 (a)
Filestore E20	£710 (a)

Full details on request

Acorn 30Mb Winchester (incl FS III Software) **£1530 (a)**

ECONET ACCESSORIES

Econet Starter Kit	£85 (b)	Econet Bridge	£174 (b)
Econet Socket Set	£29 (c)	Printer Server Rom	£41 (d)
File Server Level II	£75 (b)	10 Station Lead Set	£26 (d)
Master FS Utility Disc	£17.25 (d)		

UPGRADE KITS

1.2 OS ROM	£15 (d)	ADFS ROM	£26 (d)
DNFS ROM	£19 (d)	1770 DFS Kit	£43.50 (d)
BASIC II ROM	£22.50 (d)	Econet Kit	£55 (d)

SECOND PROCESSORS

Universal 2nd Processor Adaptor	£75 (b)
TORCH ZEP100	£229 (a)
MULTIFORM Z80 TECHNOMATICs multi format Z80 system includes a FREE Pocket Wordstar + MS/DOS Read/Write Utility	£249 (b)

ACW/CO-PROCESSOR

For full specification see page 5

32016 Co-processor	£949 (a)
Cambridge Workstation	£3450 (a)
X25 Gateway	£2175 (b)

ACORN IEEE INTERFACE

Allows BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard. The interface can link upto 14 compatible devices. Typical applications are in experimental work in academic and industrial labs. **£265 (a)**

EPROMS/RAMS

2764-25	£2.80 (d)
27128-25	£3.60 (d)
6264LP-15	£2.60 (d)
27256	£5.00 (d)
27512	£9.90 (d)

RAM/ROM EXPANSION

ATPL Board for Model B. Simple to instal, no soldering. Allows expansion to 15 Roms + 2 8K Rams	£37 (c)
ATPL Battery backup kit	£16 (d)
ATPL Board for BBC+	£31 (c)

BBC MASTER SERIES

AMB15 MASTER (see page 6 for details of bundled software included in the price)	£375 (a)
AMB12 MASTER ET	£315 (a)
AMCO6 Turbo 65C02 Module	£99 (b)
ADC08 512 Processor	£195 (b)

ADF14 ROM Cartridge	£13(d)	ADJ23 Ref Manual Part II	£14(c)
ADF10 Econet Module	£41(c)	ADJ24 Adv Ref Manual	£19.50(c)
ADJ22 Ref Manual Part 1	£14(c)	View User Guide	£10(d)
BBC Master Dust Cover	£4.75(d)	Viewsheet User Guide	£10(d)

MASTER ROM/RAM CARTRIDGES

TRC1 Two rom cartridge	£8.95 (d)
TRC4 Four rom cartridge	£11.95 (d)
TRC 32K Cartridge inc RAM	£29.95 (d)

LEARN ARABIC WITH YOUR COMPUTER

مساعد تعليم العربيه

Convert your BBC or Master computer to bilingual operation with the BABEL Arabic Package.

Beautiful Arabic text. Software developed and tested in the classroom for 2 years to help the young read and understand Arabic.

The package comprises: an easy to install EPROM, a set of keycap labels, an instruction booklet and a disc with absorbing programs: Mastering the Arabic alphabet, Arabic grammar exercisess, English to Arabic and Arabic to English translation exercises.

The BABEL Arabic Package **£70 (d)**

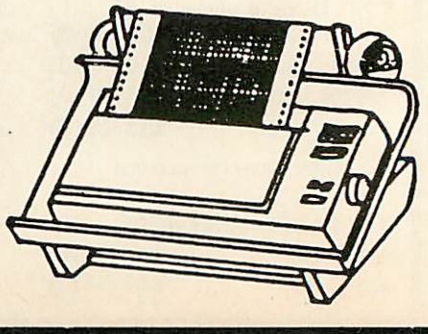
Other Arabic educational software for the converted micro; each disc **£15 (d)**

(Please specify 40 or 80 tracks). Send for more details.

Master Operating System (book by David Atherton) **£12.95 (c)**

PRINTER STAND

A new style printer stand with easy paper feed and paper seperation, provides complete access to paper. Can be used with both top and bottom paper feed. Very space efficient. **£34 (b)**



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(near Edgware Road ⊖)

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Prices are subject to change without notice
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(b) £2.50
(c) £1.50
(d) £1.00

PRINTERS

EPSON LX800	£209 (a)
150 cps, variety of fonts, including NLQ, bit image graphics, IBM char/graphics compatible, centronics interface and tractor feed as standard	£229 (a)
EPSON FX800 An enhanced version of FX85. Call for details.	£315 (a)
EPSON FX1000 An enhanced version of FX105. Call for details.	£439 (a)
EPSON EX800	£409 (a)
EPSON EX1000	£595 (a)
Colour option for EX800/EX1000.	£59 (b)
EPSON LQ800	£439 (a)
EPSON LQ1000 As LQ800 but wider carriage for 136 columns.	£609 (a)
TAXAN KP815 Enhanced KP810 with 160cps and full IBM compatibility.	£269 (a)
TAXAN KP915 Enhanced KP910 with 180cps and full IBM compatibility.	£369 (a)
NATIONAL PANASONIC KX P1081 includes *free* Wysiwyg + Rom and Printer Lead	£159 (a)
STAR NL 10 (Parallel Interface)	£190 (a)
STAR NL 10 (Serial Interface)	£219 (a)
INTEGREX Multicolour Inkjet printer. Ideally suited for high res colour VDU screen dumps. Quiteness & consistent output are major characteristics.	£549 (a)
BBC Screen dump for Integrex.	£15 (d)
BROTHER HR20 8K buffer standard expandable to 16K. Parallel & Serial ports as standard.	£349 (a)
NAT PANASONIC KX P3131 Daisy wheel printer with 38K buffer, 17 cps, bi-directional, parallel interface	£249 (a)
JUKI 6100 Daisy wheel printer 15 cps, 2K buffer, switchable 10/12/15 cpi proportional spacing, underlining. Parallel interface.	£310 (a)
Parallel Printer Lead (1.2m)	£6 (d)

MODEMS

All modems listed below will be supplied with BBC Publications ModemMaster comms package and a BBC data lead.

MIRACLE WS4000 V21/23	£140 (b)
MIRACLE WS3000 V21/23	£265 (b)
MIRACLE WS3000 V22	£445 (b)
MIRACLE WS3000 V22 bis (All modems are BABT approved)	£585 (b)
BBC Data Cable for WS3000/4000	£7 (d)
MIRACLE WS2000V21/23 & BELL stds	£92 (c)
WS2000 Auto Dial Card	£27 (d)
WS2000 Auto Answer Card	£27 (d)
WS2000 SK1 Kit	£5 (d)
WS2000 User Port Lead	£5 (d)

TIME WARP

Real Time Clock. Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program — £31 (d)

PLOTTERS

HITACHI 672	£495 (a)
LINEAR GRAPHICS Full range of accessories available for plotmate plotters	
A4S PLOTMATE	£282 (a)
A4SM PLOTMATE	£342 (a)
A3 PLOTMATE	£299 (a)
A3M PLOTMATE	£431 (a)

PRINTER SHARERS & BUFFERS

BUFFALO PB Buffer
Parallel buffer for internal fitting to most Epson printers. Simple to instal.
PB128 (128K) — £89 (c)

PERIPHERAL & COMPUTER SHARERS
High quality switches to allow the user to switch between computers, printers, modems etc. Fully shielded metal cases. all lines fully switched.

	Parallel		Serial
2 Computers to 1 Printer 36v36-2	£25(c)	25v25-2	£25(c)
3 Computers to 1 Printer 36v36-3	£39(c)	25v25-3	£39(c)
4 Computers to 1 Printer 36v36-4	£45(c)	25v25-4	£45(c)
2 Computers 2 Printers X-over 36v36-x	£49(c)	25v25-x	£49(c)
BBC Cable set 3 to 1 (1m ea)	£24(c)		
BBC Cable set 4 to 1 (1m ea)	£30(c)		

BBC Computer Sharer: TCS26
1 computer to 2 printers fitted with BBC cable — £22 (c)

Paper & Labels
Plain fanfold paper with microperforation:

2000 sheets 9½ × 11"	£12 (£3.50)
2000 sheets 14½ × 11"	£18.50 (£4.50)
1500 sheets A4 90gsm	£18.00 (£4.00)

Labels/1000

Single Row 3½ × 1 7/16"	£5 (d)
Triple Row 2 7/16" × 1 7/16"	£5 (d)

PROGRAMMING ACCESSORIES/SOFTWARE

Compatible with B, B+ and Master

EpromRyter (Epromer II) Eprom Ryter is compatible with BBC Master only	£119 (b)
Upgrade of Epromer II to Eprom Ryter (Please return your Epromer II)	£49 (b)
EPROMER II	£89 (b)
MPROMER	£49 (c)
META ASSEMBLER	£145 (b)
PORTAL EPROM EMULATOR 512K	£245(b)
TEAM Disassembler	£145 (b)
EPROM ERASERS	
UV1B 6 eproms, safety cutout	£47 (b)
UV1T 6 eproms, timer, safety cutout	£59 (b)

MONITORS

BBC lead incl with all monitors

MICROVITEC 14" RGB Monitors
Please specify plastic or metal case.

Microvitec 1431 Standard Resolution 453 pixels	£179 (a)
Microvitec 1431AP As 1431 + composite video and sound input	£199 (a)
Microvitec 1451 Medium Resolution 653 pixels	£225 (a)
Microvitec 1451AP As 1451 + composite video and sound input	£255 (a)
Microvitec 1441 High Resolution 895 pixels	£359 (a)
14" Medium Res Colour monitor with RGB TTL and Linear input, sound input. Front panel for brilliance, contrast, volume and mono/colour options. Compatible with BBC and PC Compatibles	£199 (a)
Microvitec 20" RGB/PAL/Audio Monitors	
Microvitec 2030CS Standard Resolution RGB/Comp Video	£380 (a)
Microvitec 2040CS High Resolution RGB/Comp Video	£685 (a)
TOUCHTEC-501 Brings genuine touch screen operation on metal cased Microvitec monitors, incl utilities disc with starter and development programs	£239 (b)
TAXAN SUPER VISION 620 12" Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible	£269 (a)
TAXAN SUPER VISION 625 12" Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible.	£319 (a)

12" MONOCHROME MONITORS

TAXAN KX 117 Hi Res green etched screen	£85 (a)
TAXAN KX 118 Hi Res Long Persistence (P39)	£90 (a)
TAXAN KX 119 Hi Res amber etched screen	£90 (a)
PHILIPS BM 7502 Hi Res green screen.	£69 (a)
PHILIPS BM7522 Hi Res amber screen.	£75 (a)
PHILIPS BM 7542 Hi Res White screen.	£79 (a)

MONITOR ACCESSORIES

Microvitec Swivel Base (14" plastic monitors)	£17 (c)
Philips Swivel Base	£10 (c)
Monitor Stand Models B & B+	£10 (c)
Monitor Stand Master	£13 (c)
Double Tier stand Models B, B+ or Master	£24 (b)
Taxan RGB Lead	£5 (d)
Microvitec Lead	£3.50 (d)
Monochrome BNC/Phono Lead	£3.50 (d)

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CAD/DRAWING PACKAGES

NOVACAD
Cad Package for B, B & MASTER.
(See page 5 for specification)

Tracker Ball/Mouse Version (TM)	£79 (d)
TM Version plus Tracker Ball	£119 (c)
TM Version plus Mouse	£105 (c)
Plotter Driver Generator	£25 (d)

MOUSE

AMX MOUSE with SUPER ART (pse specify B, B+ or Master)	£63 (d)
PAGEMAKER	£32 (d)
EXTRA/EXTRA (utility for the Pagemaker)	£19 (d)
MAX	£17 (d)
STAND ALONE MOUSE (includes horizontal scroll lock)	£34 (c)

RB2 TRACKER BALL

RB2 Tracker Ball with Icon Master (for B, B+ & Master)	£59 (c)
RB2 Tracker Ball with Cursor Control Rom (for Master only)	£59 (c)
RB2 Tracker Ball 'Stand Alone' for use with NOVACAD & other software)	£47 (c)
Cursor Control Rom for Master	£12.50 (d)
MIRRORSOFT FLEET STREET EDITOR	£35 (d)

CP/M SOFTWARE

Send for details on our full range of CP/M & PC DOS packages for Business, Communications & High Level Languages.

Please send for details on our range of CP/M software for Acorn/Torch Z80 2nd Processors

BBC SOFT/FIRMWARE

All software supplied by us is known to operate with the appropriate Acorn Disc filing systems. We ***cannot*** *comment on their use with other DFS systems.*

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£37 (d)
STARdataBASE	£39 (d)
MASTERFILE II	£17 (d)
ACORN OVERVIEW PACKAGE Special Offer (RRP £86)	£57 (b)

WORD PROCESSORS

ACORN VIEW PROFESSIONAL	£85 (c)
VIEW 2.1	£37 (d)
VIEW 3.0	£49 (c)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR	£7 (d)
VIEWSPELL	£29 (d)
DOT PRINT PLUS	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS	£21 (d)
SPELLMASTER	£47 (d)
INTERWORD	£39 (d)
WORDEASE	£24 (d)
SPELLCHECK III	£31 (d)
EDWORD II	£43 (c)

SPREADSHEETS

VIEWSHEET	£37 (d)
WINDOWMATIC	£15 (d)
VIEWPLOT	£22 (d)
INTERSHEET	£37 (d)
INTERCHART	£26 (d)
ULTRACALC	£29 (d)

MINI OFFICE II DISC Version

For B & B+ 40T or 80T	£14.50 (d)
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A series of programs developed in many cases alongside Radio & TV programmes by BBC's Education Department which supplement the classroom studies by moving and colourful displays helping in clear understanding of a variety of subjects. Some packages also include audio cassettes.

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Additional charges for discs		£9.00 (d)
DEUTSCH DIREKT	Disc/aud/EC	£16 (c)
	Book	£5.95 (d)
MODEM MASTER		£11 (d)

Cassette based programs listed above can be supplied on disc at an extra charge of £1.50 per disc and please specify the format required 40 or 80T.

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE
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NOVACAD

Computer Aided Draughting for the BBC Micro

"Novacad can drive a plotter to provide drawings of a high quality... Novacad is excellent. It is flexible, genuinely easy to operate without much practice, and a pleasure to use." **Beebug December 1986**

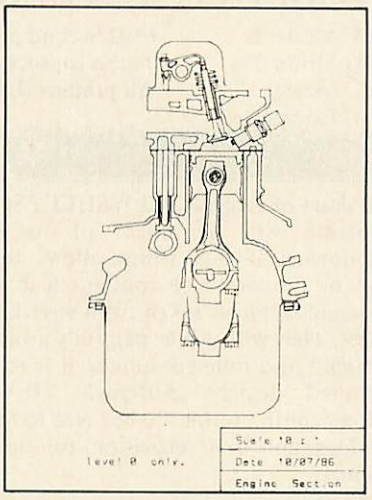
"Novacad is a professional package, well worth the £90 for the ROM and disc and is expandable to suit your own particular requirements. I would have no reservations if I heard Novacad called, "the best on the market"." **A&B Computing August 1986**

A sophisticated CAD package with unique facilities which are generally confined to the professional CAD packages costing thousands of pounds.

NOVACAD is being used in widely differing fields ranging from leading British industries for producing engineering drawings to Accountants' offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing professional quality output are making extensive use of NOVACAD's unique features. NOVACAD is proving to be a invaluable teaching aid in technical schools and colleges simply because of the ease with which it can be used.

NOVACAD'S MAJOR FEATURES

* Simple and easy to use with logical command sequence.
* A large drawing area (approx 15 screens).
* The ability to create complex icons (upto 500 lines instead of the usual 15 to 20 pixels), store them in a library and recall them at different scales and orientations.
* A zoom facility allowing magnification of up to 20 times to insert finer details.
* Block copy of shapes on the screen for repetitive use.
* Text entry at any 90° orientation at any position on the screen.
* Create multi layer drawing with 8 levels available.
* Full compatibility with the BBC range with minimal hardware requirements yet having the capability of exploiting the potential of the extra shadow memory or the second processor's memory and speed.
* Printer routine for Epson 80 and 136 column printers.
* A unique optional facility to output to any BBC compatible plotter.
* Cursor control from keyboard, tracker ball or mouse.



NOVACAD package includes a 16K ROM, Utility disc and a comprehensive manual.

MINIMUM HARDWARE REQUIREMENTS

- **Any BBC range computer with Acorn DFS.**
- **40 Track single sided single drive.**
- **Epson compatible dot matrix printer.**

With basic BBC B, NOVACAD operates in mode 4 allowing use of any 2 colours. With shadow memory of the BBC+ or the Master, it can also operate in mode 0 for higher resolution or mode 1 for allowing use of any 4 colours, and it will provide additional user memory for more complex drawings.

6502 second processor or the Turbo on the Master will also increase the drawing speed considerably.

OPTIONAL EXTRAS

Plotter driver generator is available as an optional extra to configure a plotter routine for any BBC compatible plotter. Pre-configured programs for the popular plotters like **Epson HI 80, Hitachi 672, Plotmate, Penman** and **HP GL.** This program allows the drawing to be scaled to the maximum plotter size thus enabling drawing of A2 and A3 sizes to be produced with equal ease. The zoom facility will enable inaccuracies of drawing on the screen to be eliminated.
ROUTCAD, an optional software package for our Graphics Workstation allows for production of shapes drawn using NOVACAD in 3D on suitable material and is ideal for a range of applications including template making and model building.

EpromRyter

A powerful eprom programmer for use with the BBC Master. It offers the latest 'state of the art' programming techniques to provide fast and efficient operations.

The software is totally menu driven and on screen help messages make the programming simple for both specialists and novices alike.

The EPROMRYTER interfaces with the Master through 1 MHz bus. It is mains powered with its own psu. 3M Textool zif socket has been fitted to ensure consistent and reliable service over long periods.

The single rail eproms handled by the EpromRyter are:
- 2716 2732 2764 27128 27256 27512 27513 27011 2516 2532 2564 (NMOS & CMOS)
- One time eproms P27XXX, 87CXXX etc.
- Also A suffix eproms such as 27XXXA

EPROMER II

A proven Eprom programmer for BBC Model B and B+ with thousands in use in industry, educational and R&D establishments. It offers many of the powerful features of the EpromRyter and can program all single rail eproms upto 27256. Full details on request.

The main features of the programming software are:

* Device, function and voltage selection from the computer keyboard.
* Continuous display of the options selected.
* All eproms upto 27512 (64K) programmed in single pass.
* Automatic Intelligent identifier support for eproms able to respond.
* Selectable programming voltage 25/21/12.5V
* 3 programming methods: Normal, Intelligent & Pulse (20 sec for a 27128).
* Serial port protocols supported.
* DFS, NFS, ADFS and Rom Filing System Supported.
* BASIC/Machine Code programming using RFS.
* Powerful editor with input in HEX or ASCII. * Full editable 64K file.
* Block move of data within the address range.
* User can select any section of the eprom from single byte to the full address range to blank check/burn/verify. Facility to program single bytes makes program development/amendment simpler.
* Multiple loading for ROM Filing System

Some of the above features apply to Master Computers only

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* Cased with power supply and cooling fan
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* Fully compatible with S.J. Research file server
* 12 months warranty
* Special front end utility for BBC Master

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Special Adaptor for S.J. Research File Server **£28**

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VU-Type, Wordmover, Wordplay, Drawstick, Locomotion and Pantry Antics

3½ DISC DRIVES

* 400K/640K capacity per drive in DFS/ADFS modes
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* The drives are supplied fully cased and with cables ready for connection to a BBC Computer
* Drives powered from the computer * 2 years warranty

Single Drive £75(b) Dual Drive £134(b)

META Version III

"All the good features you would expect to find in a good source code editor are present . . . Meta assembler lives in a different world. It is structured to work with any new processor . . . as new instruction sets can be added . . . as needed . . . has a well featured editor with colour highlighting, a sound modular approach." **Acorn User October 1986**

- Assembles for over 30 popular processors, including Z80, 6800/01/02/04/05/09/11 etc — and 68000 — using native mnemonics for each processor, eg. LD A, (HL) for Z80 and MOV AO, $1000 for 68000 etc.
- Fully integrated Editor: four field, all search, search/replace, block copy, delete, move, marked save, load etc.
- Compatible with Portal Eprom Emulators and Team Disassemblers.
- Send object code in Intel Hex, S-Record, straight binary etc. down to discs, RS232, parallel port, Eprom Emulators etc — all **during Assembly.**
- Over 50 directives included as standard: handling nestable macros, conditional assembly and twenty types of table definition directives.
- 32 bit labels; 31 character names. Arithmetic and Boolean arithmetic to 32 bits.
- Modular source code with numeric and string parameter passing.
- Serial communicator area with eight options lines: echo, control code trap, LF supression/addition etc.
- Over 500 in use throughout the world in universities and many different industries.
- Two 16K Roms, two 80 track discs, A4 ring-band manual, function-key strip.

PORTAL EPROM EMULATORS

- Emulates 2716, 2732, 2764, 27128, 27256, 27512 eproms at 150ns Access time.
- Load at 4Kbytes/second — No "erase" time.
- 28 pin header plugs into Eprom socket on target system — status monitored on 13 Leds.
- Fully software controlled from Meta Assembler.
- 100 times faster than standard EPROM program/erase cycle.
- Fully CMOS compatible; draws no power from target system.
- Four portals may be independently programmed off same user-post cable.
- Complete with all cables, manual and disc.

PORTAL 512 (2716, 2732, 2764, 27128, 27256, 27512).

TEAM DISSASSEMBLER

The third part of the Universal Development System: a Meta labelling dissassembler.

Supports 1802, 8080, 8085, HD64180, Z80, 65XX (includes 65 col, 6511 etc), 68XX (includes 00, 01, 02, 03, 08 etc):

- Up to 64K of object code translated back into META compatible source code modules: labels automatically inserted on all jump targets, memory references etc.
- Pre-editing stage allows marking of object code areas as byte, string, word, long word etc, tables. These areas dis-assembled into appropriate directives instead of garbage mnemonics.
- Reconstituted source code ready for immediate re-assembly by META.
- Omniversal search/replace for re-naming arbitary label names with meaningful ones.

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BBC MASTER with Turbo Board **£493**

512K Processor Add on Board "inc. Mouse and GEM package" **£195**

BBC AIV (Domesday) System **£4479**

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£99
BBC MASTER ET (Econet Terminal)	£315
Econet Module for the Master	£43
Twin ROM Cartridge for Master	£8
Quad ROM Cartridge for Master	£12
Universal Processor Adaptor	£75
Reference Manual I	(No VAT) £14
Reference Manual II	(No VAT) £14
Advance Ref. Manual	(No VAT) £19
64K Upgrade Kit for B+	£32
Acorn 1770 DFS Kit complete	£42
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
Z80 Acorn 2nd Processor package	£325
ARIES' Professional IEEE Interface	£238
Acorn IEEE Interface Complete	£265
Morley Teletext Adaptor	£104

BBC MASTER COMPACT

All Master Compact Microcomputers are supplied complete with an integral 3½" Disc Drive and various educational and professional bundled softwares.

System 1	Standard Package	£349
System 1A	System 1 + TV Modulator	£363
System 2	System 1 + Green Hires Monitor	£399
System 3	System 1 + Medium Res Colour Monitor	£549

RS232 Kit for BBC Compact **£26**

Additional 3½" Drive for BBC Compact **£99**

(Securicor carriage £7)

The 80186 Co-Processor

This package consists of the Master 512 board, Watford Co-Pro Adaptor, Acorn 1770 Disc Upgrade and Acorn ADFS. The Master 512 board using the 80186 16 bit Processor at 10MHz and running Digital Research DOS Plus, gives a high degree of IBM compatibility at an extremely reasonable price. Included in the 512k package is a mouse and the amazing Digital Research GEM suite of software; GEM Paint, GEM draw and GEM desktop giving a complete Mouse Icons environment (All other GEM packages will work on the 512k). Famous packages that will work with the 512k board include Wordstar, Dbase II, Lotus 123 and many others. The only requirement to upgrade any BBC Model B to this system is you must have twin 80 track disc drives.

£275

ARCHIMEDES Micros

Model 305

Basic System	£799
with Green Monitor	£849
with Colour Monitor	£999

Model 310

Basic System	£875
with Green Monitor	£925
with Colour Monitor	£1075

VARIOUS PRINTERS & ACCESSORIES

Brother HR15 RS232 Daisy Wheel	£275
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Epson EX1000 Printer	£550
Epson FX800 Printer	£315
Epson FX1000 Printer	£439
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Epson LX800 Printer	£210
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(Securicor Carriage on Printers £7)

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(Ideal for School environment)

Connects	Serial	Centronics
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6 BBC Micros to 1 Printer	–	£99

PRINTER CHANGER

3 Printers to 1 Micro (Centronics) **£65**

(Cables extra, specify type required when ordering)

65C102 2nd PROCESSOR

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B.

£139

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EPROMs for BBC's Sideways ROMs.

2764-250nS £3.50
27128-250nS £3.75

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £2.70
2 × 6264LP (16K) £5.30

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(IBM/Epson compatibles)

Kaga KP815 Printer	£269 (carr £7)
Kaga KP915 Printer	£350 (carr £7)
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

RX & FX PRINTER INTERFACES

Epson interfaces fit inside the printer to allow connection using techniques other than Centronics.

RS232	£27	RS232 + 2K Buffer	£55
IEEE 488	£65	RS232 & 8K Buffer	£75

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Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA, Panasonic etc. printers.

Standard length (4 feet long)	£6
Extra long (6 feet long)	£8
Compact's Special Centronics Lead	£9
RS232 Cable	P.O.A.
IBM Parallel 1 metre Cable	£9

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Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Brother HR15/20	£3.00	£5.00
EX/LQ800	£7.50	£4.50
EX/LQ1000	£8.00	£5.00
FX80/85/800/MX80	£4.50	£4.95
FX100/1000	£7.00	–
Kage KP810	£5.25	£4.75
LQ2500	£9.00	£5.50
LX80/86/800	£4.00	£4.50
M1009/GLP	£4.00	£3.75
Panasonic KX1080/81	£4.50	£4.75
SQ2500	£25.00	£5.50

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

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1000 Sheets true A4 Fanfold Paper	£11
2000 Sheets true A4 Fanfold Paper	£20
Teleprinter Roll (Econo paper)	£4

Carriage on 1,000 Sheets £1.50

PRINTER LABELS

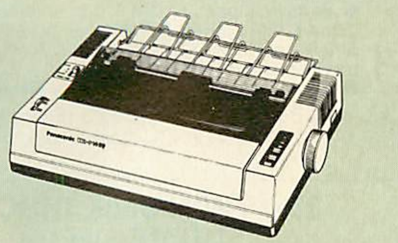
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1,000 90 × 36mm (Single Row)	£5.00
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Carriage on 1,000 Labels £1.00

Panasonic KX-P1081

(Now IBM/Epson Compatible)



Available NOW at a superbly realistic price, the KX-P1081 perfectly balances features, quality of construction and Value for Money to produce the printer of tomorrow, here today, ready to sweep the current generation of machines away.

Ingenious innovation in terms of software control codes permits great flexibility when it comes to defining the print style. A nippy **120 cps** of clear Draft text backs up the crisp 24 cps Near Letter Quality text mode, with upto 40 superbly useful downloadable characters. A delightful range of assorted character widths is efficiently supported, with sizes ranging from a broad 5 cpi to petite 17 cpi, EVEN in NLQ mode. Some of the extensive support for serious use includes specialised functions to perform justification, centering and even left and right ranging. Proportional spacing permit even greater freedom when it comes to advanced use. Not only is the full Epson RX compatible control code set implemented, but extra codes have also been added to cater for the NLQ options, etc.

A full 96 ASCII character set is supported, with an extended set of 32 international characters and IBM special characters as well as IBM block graphics characters. A 1K Print Buffer alleviates much of the wait time normally associated with printing, whilst the bi-directional logic seeking print head takes the quickest route to print as required.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£149** (carr. £7)

Optional RS232 Interface: **£39**

Panasonic KX-P3131 Daisy-Wheel Printer

This low-cost high-performance Daisy Wheel printer is ideal for anyone wishing to produce clear, immaculate letters or reports. It delivers, flawless text at 10, 12 & 15 CPS. Supports proportional spacing. Is Bi-directional, logic seeking. Printing speed: 17CPS. Has 6k printer Buffer. A printer of similar spec could cost a lot more than our ridiculously low price of:

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JP101 accepts 9½" standard fan fold paper or single A4 sheets. Tractor & Friction feed supplied as standard – print speed 50 cps.

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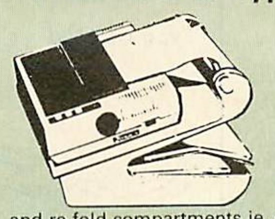
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Printer Stand Type-YU-S25



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STAR BUY

- **PHILIPS 14" Hi-Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono connectors. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display.**

ONLY £209

ZENITH

"Test Bureau Recommended for use in Education"

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. (These are the same professional quality, stylishly finished monitors as used in the larger Zenith PC Systems.)

Green (New Design) Hi-res	£69
Amber (New Design) Hi-res	£74

LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for KAGA	£3

N.B. carriage on Monitors **£7** (securicor)

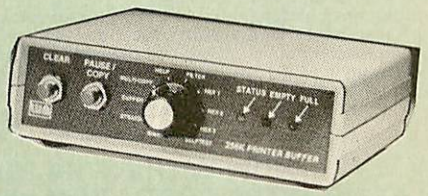
SWIVEL BASES

for Video Monitors

By placing your monitor on one of our superb swivel bases, you gain the freedom to adjust the monitor viewing angle to suit your needs. By doing this, you alleviate eye strain and reduce back stress. Front adjustable without lifting the monitor.

for 12" Monitors **£8** (carr. £2.50)
for 14" Monitors **£10** (carr. £2.50)

MEGABUFFER 256



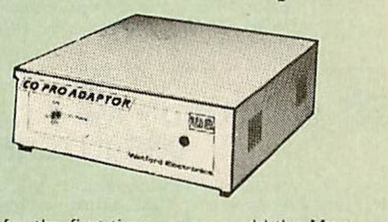
This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Low Cost, High performance.
- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £125 (carr £2)

CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.
Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.
With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.
To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.
Master owners may use Co-Pro to add a second Co-processor externally.
Watford, brings power to your BBC at only:

£50.00 (carr £5)

Continued →

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED (BOOK)

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for four years, and has gained a large following amongst serious users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS). (not Acorn's 1770 DFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£54**
- *Acorn's 0.90 DFS Kit complete* **£52**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**
  (P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs).
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics and their appointed dealers only. Every ROM carries a special label with LOGO and serial number.*

NEW WATFORD's Mk II Double Density DFS INTERFACE

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our DDFS board has been adapted to allow the use of Acorn ADFS.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

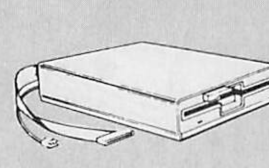
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only £30.00.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your Existing DFS or DDFS for our DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

SPECIAL DISC DRIVE/DDFS OFFER

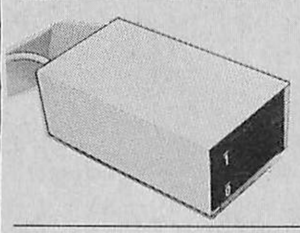
Type CLS400



- The popular Mitsubishi 400k Single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's popular DDFS Disc Interface (allows 720k storage). Will run in both Single and Double Density modes 40/80 track Software switchable.
- A comprehensive User Friendly Manual.

A Bargain at Only **£125** (£6 carr)
(Offer valid while stocks *last)*

3½" TWIN 800K DISC DRIVE OFFER



These top quality 3½" Disc Drives are attractively finished in BBC beige and are supplied complete with Cables. They run directly from the BBC B/Master's own PSU.

Special Offer **£126**

DISC DRIVE SHARER

(Ideal for educational establishments)

At last, a low cost alternative to the econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disc, and red means that you are next in line.

The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not compatible with ADFS.)

Launch Price: **£59** (Price includes 3 Cables)

MYSTERIES OF DISC DRIVES & DFS REVEALED (BOOK)

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

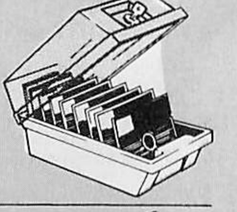
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£7

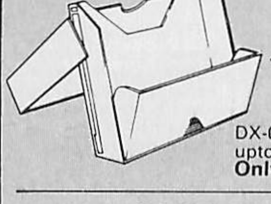
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection –
Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

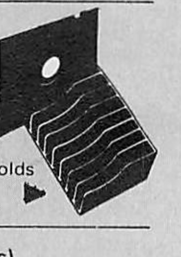


- **M35** - holds upto 50 5¼" discs **£6.50**
- **M85** - holds upto 95 5¼" discs **£8.00**
- **M50** - holds 50 3½" Discs **£7.50**

PLASTIC LIBRARY CASES



◀ Holds up to 10 5¼" Discs. **Only £2.00**



DX-08: This extremely handy unit holds upto 8 5¼" Disc while in use. **Only £2.00** ▶

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

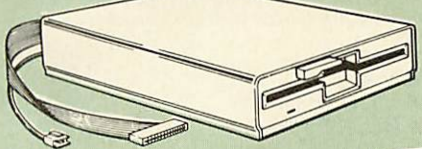
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

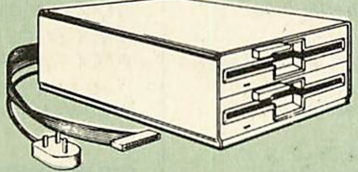
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. *(Turn to the 6th page of our advert for the Plinths).*

P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.





Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £90		CS 200 £102	
400K (720K)	CLS400S £92	CLD 400 £175	CS 400S £103	CD400 £196
800K (1.44M)		CLD 800S £179		CD 800S £198

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes* — *£9*
- *10 × 5¼" D/S D/D 40 Track Diskettes* — *£11*
- *10 × 5¼" S/S D/D 80 Track Diskettes* — *£13*
- *10 × 5¼" D/S D/D 80 Track Diskettes* — *£13*
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT* — *£28*
- *10 × 3½" S/S D/D 40/80 track Discs* — *£18*
- *10 × 3½" D/D D/D 40/80 track Discs* — *£22*

TOP QUALITY 3½" & 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 × **M3** 3½" D/S D/D 80 Track Discs* — *£18*
- *10 × **M4** 5¼" S/S D/D 40 Track Discs* — *£7*
- *10 × **M5** 5¼" D/S D/D 40 Track Discs* — *£9*
- *10 × **M7** 5¼" D/S D/D 80 Track Discs* — *£11*
- *3" Double Sided Discs* — *£3 each*

Special BULK OFFER on 5¼" DISCS



(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

ACORN WINCHESTER DRIVES

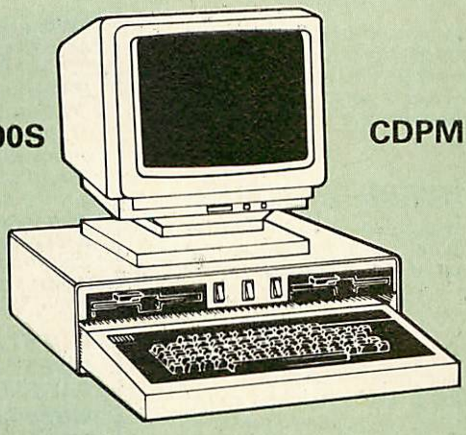
Supplied complete with Level 3 Econet File Server software.
20 Megabytes **£699**; **30 Megabytes £1549**

WATFORD's WINCHESTER DRIVES



- 10 Megabyte Unit with ADFS — **£399**
- 20 Megabyte Unit with ADFS — **£499**
- 40 Megabyte Unit with ADFS — **£999**

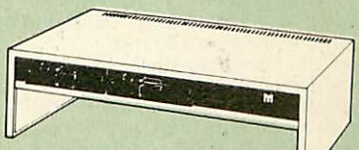
CDP 800S **CDPM 800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £119 **CDPM 800S for Master £205**
(Securicor Carr. £7)

ACORN'S Twin 800K Disc Drives

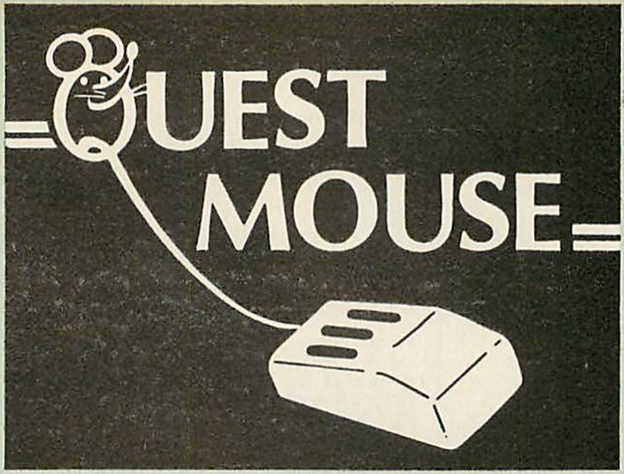


Specially mounted side by side in a Master Plinth. Supplied complete with Cables. Plugs directly to the Master Computer.

RRP ~~£250~~ **Our Price: Only £189** (carr £7)

NOMINATED FOR

BRITISH MICRO COMPUTING AWARDS 1987



QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and is smooth and easy to use on most work surfaces. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that programs such as AMX Pagemaker etc, will work with it.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package
With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87
"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."
"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87
"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87
". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package. . ."

". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."
"Quest Paint is a major leap forward in BBC programming. . ."
"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

QUEST MOUSE & QUEST PAINT	***£55***
QUEST MOUSE, QUEST PAINT, AMX PAGEMAKER & PAGEFONT	***£85***
QUEST MOUSE ONLY	***£29***
QUEST PAINT SOFTWARE	***£32***
QUEST FONT DISC	***£12***
QUEST MAT	***£3***
Part-exchange your old Mouse for a New QUEST MOUSE for only	***£23***

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 24 text FONTS for use within Quest Mouse.
P.S. There is no need to worry about any of your existing AMX mouse software. The Quest Mouse is totally AMX compatible so it will work with any of the AMX range of software.

All prices in this advert are exclusive of VAT.

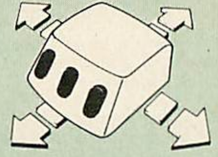
MARK II LIGHT PEN + PENPAL 2

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.
Penpal II, Watford Electronics' sophisticated light pen software is also supplied free on cassette or disc (please specify). This is a highly sophisticated drawing package enabling you to gain the maximum benefit from your Light Pen. The software is used to edit Mode 2 full colour screens using lines, patterns and you own designs. Screens may be saved to cassette or disc.

Price Only £18

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

THE AMX MOUSE



Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £59 (carr £1.50)
(Please specify for BBC or Master Computer)

We are giving away, absolutely **FREE**, our popular Colour Art software package worth **£15** with every AMX Mouse package purchased from us.

AMX MAT	**£3**
AMX MOUSE ONLY	**£29**
AMX DESK Package	**£19.00**
AMX UTILITY Package	**£11.00**
AMX SUPERART Package	**£39**
AMX PAGE-MAKER Pack – A desk-top publishing software. It Works with keyboard, joystick and a mouse	**Only: £32**

We are giving away, absolutely FREE, PAGE-FONTS, a disc containing over 20 fonts, with every purchase of AMX PAGE-MAKER from us.

PAGE-FONTS Over 20 fonts for use with AMX PAGE-MAKER	**£9.50**
EXTRA EXTRA	**£19**
AMX DESIGN (ROM)	**£59**
AMX 3D ZICON Disc	**£19**
AMX Database Disc	**£19**
AMX XAM Educational	**£19**
AMX MAX A gem of desktop (ROM)	**£17**

RB2 MARCONI TRACKER BALL

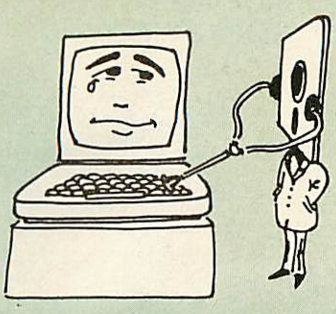
Complete with Software Disc	£59
RB2 + Software Disc + Quest Paint	£85

FLEET STREET EDITOR

Software pack **£35**

Admin Xtra Disc Utility	**£13**
Walt Disney Disc Utility	**£13**
Fonts N Graphics Disc Utility	**£13**

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Cassette). 4 primary level maths programs **£9.95**
- Maths with a Story 2 (Cassette) 4 further maths programs **£9.95**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£19.95**
- WAVES: Science Topics (Disc) CSC O Level Physics program. **£14.95**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£14.95**
- BONDING: Science (Disc) O Level Chemistry program. **£14.95**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£14.95**
- ELECTRONICS IN ACTION (Disc) O Level program **£14.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTECHNOLOGY (Cassette) O Level program. **£6.95**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£17**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£20**
- Modem Master (Disc) **£11.25**
- ADVANCED TELETEXT SYSTEM **£6.90**
- PERIOD TABLE SOFTWARE **£20**
- USING YOUR COMPUTER (Cassette) 8-12 age **£24**

TED
THE ULTIMATE TELETEXT SYSTEM

TED is one of a new generation of powerful 32K ROMs for the BBC B, B+ and Master computers and is compatible with disc, tape and network systems. It is in everyday use in schools, colleges and universities, Programmers, Prestel I.P.'s, Micronetters and exhibitors have also found it indispensable.
TED includes the most comprehensive teletext (Mode 7) screen editor ever written for the BBC micro, combining flexibility with ease of use. Its sophisticated facilities include line, column and block copying within AND between frames; text, in a variety ofstyles and sizes, entered directly from the keyboard; graphics and line drawing modes; search and replace; margins; printer dump routines and a library of in-built icons and typefaces. TED will edit ANY mode 7 screen and can even convert high-res graphics screens to mode 7! Included within the ROM is a fully Epson compatable mODE 7 graphics dump routine giving a grey scale printout of exactly what appears on the screen.
Using '*SHOW' (a versatile carousel), collections of mode 7 screens may be 'routed' or displayed sequencially, making it ideal for creating andrunning 'Viewdata' information systems. Over 1200 frames may bestored on a twin 80 track drive. A unique feture of TED is '*SCROLL', which lets you create pages of up to 600 lines which may be viewed 'Wordwise style', automatically or manually. SHOWs and SCROLLs may be freely mixed and even used from within a BASIC program.
The package comprises a 32K ROM, a 117 page manual, a function-key strip and a demonstration disc containing examples of real-time animation and a sample 55-frame database. A stand-alone machine code routine is provided allowing SHOWs and SCROLLs to be displayed on machines not fitted with TED.

Price: £35

ROM-SPELL

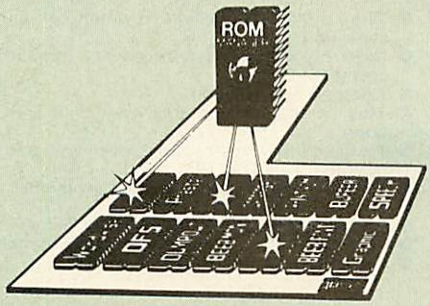


Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.

NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

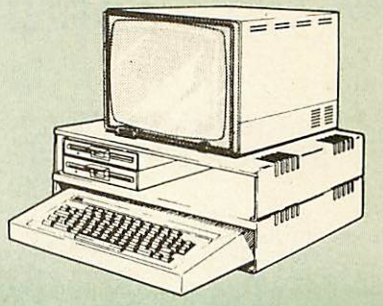
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

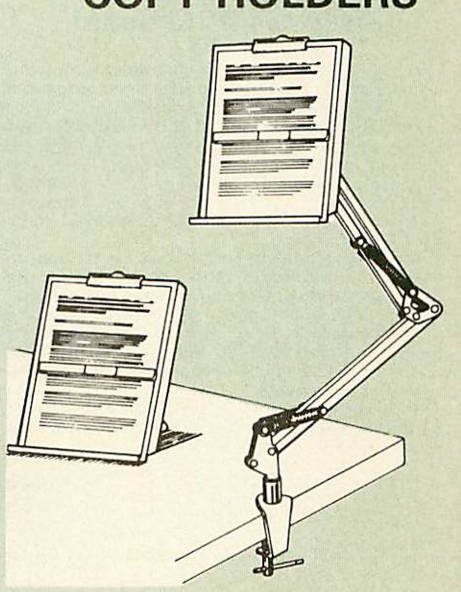
PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£20** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£25** (carr £2.00)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.
Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a plastic retaining ruler and a clip grip. Both units are full A4 size.

Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

Continued →



ARIES CORNER

The Aries B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: **£80** (carr. £2(

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:	Aries B-12	**£40**
	Aries B-12C	**£5**

ARIES B-488 IEEE-488 INTERFACE UNIT

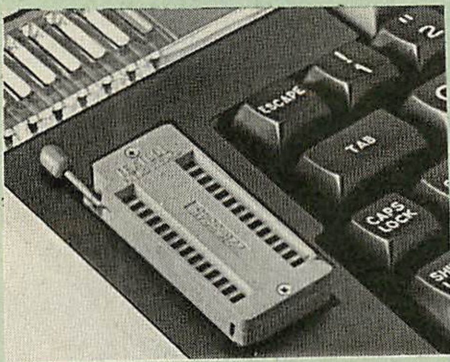
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

GRAPH PAD 2

Supplied complete with Software
£60 (Carr. £3)

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

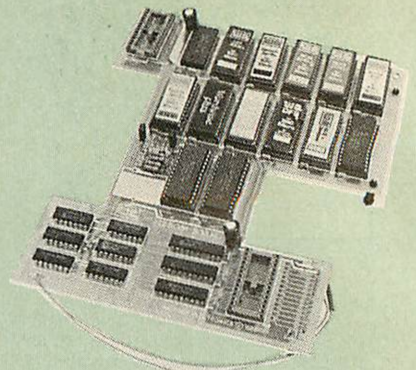
Only: **£24** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

All prices in this advert are exclusive of VAT.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

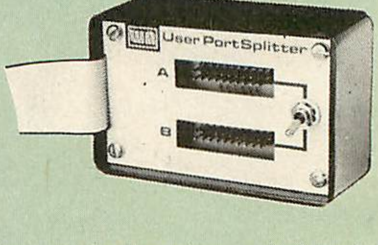
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

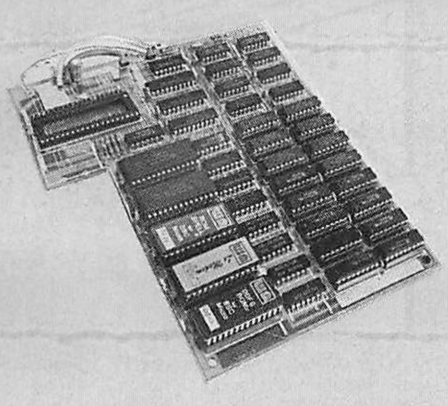
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£15**

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- *ROM/RAM card with 32k dynamic RAM* ***£39***
- ROM/RAM card with 64k dynamic RAM ***£52***
- ROM/RAM card with a massive 128k dynamic RAM **£80**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- *16k plug-in Static RAM kit* ***£6***
- *16k Dynamic RAM for Upgrade* ***£7.50***
- *Battery backup* ***£3***
- *Read and Write protect switches* ...... ***£2 each***

Complete ROM-RAM board
All options installed ***£89***

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £10 less

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***
- *BT Approval applied for.*

(When ordering, please specify the version required, (BBC or Master)

SPECIAL OFFER

Price: **£74**
(carr £3)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

£82

(Price includes: Nightingale Modem, Commstar ROM pack & Comprehensive manual)

Nightingale Modem without software **Only £75**
COMMSTAR ROM package only **£29**
(P&P on modem £3.00)

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£75** **(Carr £3)**
(Write in for full specification)

Minerva Systems Software

System Delta with Card Index	£55
System Programmers Ref. Guide	£19
System Gamma	£43
System Gamma Prog, Ref, Guide	£19
System Mailshot	£17
System Reporter	£17
System Intrer/View Link	£17

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£25
DISC DOCTOR	£28
Graphics ROM	£23
TERMI	£25
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£24

Wordwise £24

Wordwise plus

WORDWISE PLUS
£40
We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only £24

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £47

Inter SHEET ONLY £37

INTER-CHART ONLY: £26

Inter-WORD
Only: **£39**

INTERBASE £55

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£37
VIEW 3.0 ROM	**£54**
VIEW PROFESSIONAL	**£79**
HI-VIEW (for use with 6502 2nd Processor)	£36
VIEW Printer Driver Generator Please specify Disc or Cassette)	£9
VIEWSHEET (Acornsoft)	£37
VIEWSTORE	£37
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£22
VIEW-INDEX	£12
OVERVIEW Packs 1 & 2 for the Master	£75

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

Micros in Business (Disc)

An introduction to Business software for the BBC Micro from Acorn £43

ADVANCE COMPUTER PRODUCTS' ROMs

Adv. Disc Toolkit	£29
Adv 1770 DFS for Mast/Compact	£29
Adv 1770 DFS for BBC/BBC+	£29
Adv Disc Investigator	£24
Adv. Control Panel	£29
Adv. Rom Manager	£13

MINI OFFICE II

Disc Version	£14.50
ROM Version	£48.00

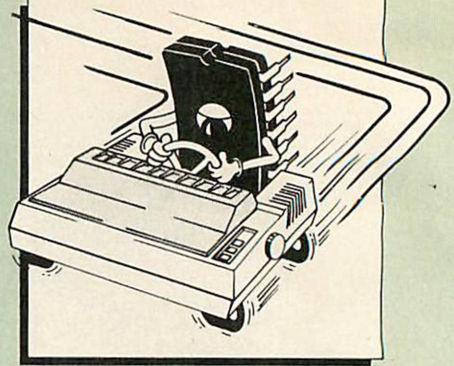
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

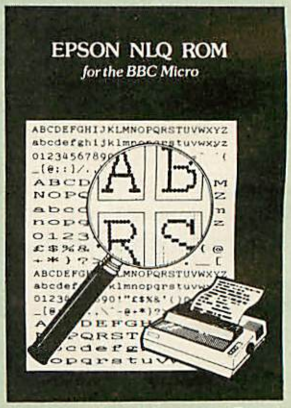
The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

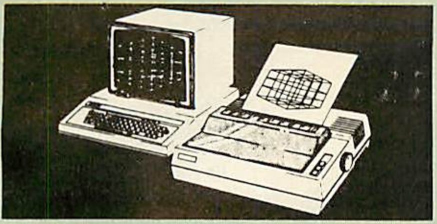


Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.
(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:
- *Vertical and horizontal scaling in all graphics modes and mode 7*
- *Rotation of image by 90, 180 or 270 degrees*
- *Left hand margin setting*
- *Screen dump window setting*
- *Colours appear as grey scale*
- *Two tone fast dump*
- *Colour mask*
- *Mode 7 contrast expansion*
- *Mode 7 contiguous dump*
- *Key triggered and User Port triggered dumps*

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1080, Mannesman Tally and compatibles.

Only: £25

(Write in for further details on all above ROMS)

THE EUREKA CARD

(The Unique RAM Expansion System)

The Eureka Card is Watford's latest and most sophisticated RAM expansion system. Using advanced PAL based technology this card is a breakthrough in RAM systems for the BBC micro. The Eureka Card provides the user with around 58K of free memory in Basic, VIEW and WORDWISE PLUS. You also get Shadow RAM from within the active language. No other RAM expansion system can match that!

Load up to 58K long Basic programs. Texts in VIEW and WORDWISE PLUS up to 58K as well. This with absolutely NO loss of speed in accessing your text or program. Eureka consists of a card containing 64K of program memory, two parallel banks of sideways RAM and some extremely complex switching circuitry. This is all controlled by Eureka's highly sofisticated software supplied in ROM. Designed to a very high specification, this board is fully buffered to give reliable operation under virtually any circumstances.

The Eureka board plugs into the 6502 socket and has NO messy flying leads. It is compatible with many other products from Watford, such as our Solderless ROM Board and our ROM/RAM Board. All in all, the Eureka Card is an amazing board. Jump into the age of serious data processing with a Eureka Card! Please write in for further details 'on advantages the Eureka can offer you'.

Introductory price: Only **£89** (carr £3)

(P.S. Eureka is only suitable for a standard model B; it normally replaces any Shadow RAM cards present. Some speed degredation does occur with filing system access. Eureka cannot be used at the same time as a second processor).

BEEBMON

The most powerful machine code monitor for the BBC Micro **£24.**

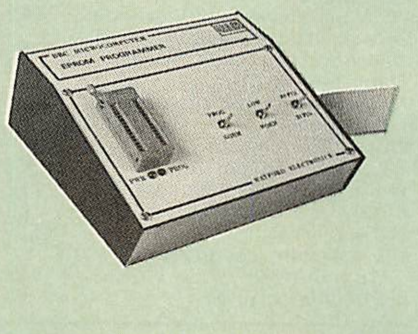
THE NLQ DESIGNER

(The First & still the Best)
Supplied with over 25 Different fonts

A massively useful utility for users of the Taxan/Kaga KP810/910 or the Canon PW1080. This program allows you to define NLQ character sets to download into the printer's memory. Full on screen editing of the font. Requires 6264 RAM chip to be fitted in the printer.
Supplied with disc containing over 25 example fonts. Please specify 40 or 80 track. Fonts are: Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print and Gothic etc. (P.S. This ROM is not suitable for Epson printers.)

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ADDER



Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

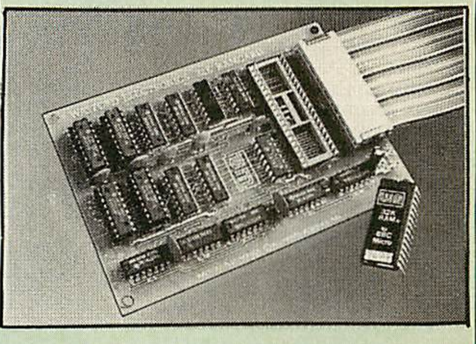
Features:
- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£65 (£3 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.
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- Spare UV tubes. **£9**

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.
- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

See next page for SPECIAL OFFER

Only £59 (carr £2)
(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

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All this for only **£21** (Disc)

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- BEEBCALC SPREADSHEET
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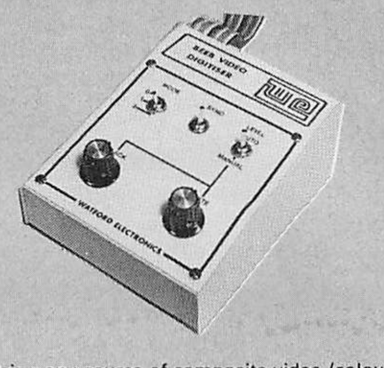
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SPREADSHEET – Offers many calculation and editing features.

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Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)

A combination of the AMX Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within AMX Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

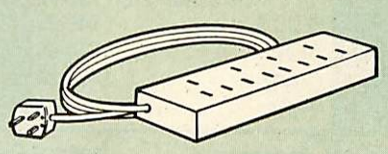
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Protection for only **£6.99**

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SPARES for BBC Micro

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8 WAY DIP SWITCHES

With these DIP switches soldered to their keyboard, any BBC B or B+ owner can take full advantage of the fast disc drives that we supply by configuring his BBC for fast disc drive operation.

Excellent value for money at **£1.00**

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(All ready made and tested)

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6 pin DIN to 6 pin DIN Plug (RGB)	**£2.50**

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Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

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BBC to Disc Drives Ribbon Cable

Single **£4** Twin **£6**

MISCELLANEOUS CONNECTORS

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Paddles (15 pin 'D')	80p	200p
BBC Power Plug 6 way	80p	–
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Badger Micros (Devon), Badger's Hill, Southerton, Ottery-St. Mary, Devon EX11 1SE. Tel: 0395 68516.

Beebug Retail, Dolphin Place, Holywell Hill, St. Albans.

Cambridge Computer Store, 4 Emmanuel St., Cambridge CB1 1NE. Tel: 0223 358264.

Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts.

C.J.E. Micros, 78 Brighton Road, Worthing, West Sussex. Tel: 0903 213361.

HCCS, 575-583 Durham Road, Low Fell, Gateshead, Nr. Newcastle Upon Tyne. Tel. 091 4870760.

Mancomp Ltd, Printworks Lane, Levenshulme, Manchester. Tel: 061-224 1888-9888.

Microman Computers, Rainford Industrial Estate, Mill Lane, Rainford, St. Helens

The Computer Depot, 205 Buchanan Street, Glasgow G1 2JZ. Tel: 041-332 3944.

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Alpha Computer Co, Shop 314 Chi Fu Commercial Centre, Chi Fu Fa Yuen, Hong Kong, Tel: 5-506592.

Computer Distribution Company, Parklaan, 47, B-9300 Aalst, Belgium.

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Lendac Data Systems, Unit 31, IDA Enterprise Centre, Pearce Street, Dublin 12. Tel: 710796.

Scientex P.V.B.A., Zilversmidstraat 2, B-2000 Antwerpen, Belgium, Tel: 03 233 59 06

Techno-matic Data, Holbergsgade 19, 1057 Kobenhavn K, Denmark

*Velobyte, Scheaedyksadyk 5a-6a, 3011 EB Rotterdam, Holland, Tel: (010) 413 8197/414 5171.

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ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

£2

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Master Termulator	£34
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ORDER VIA MicroLink 72:MAG030

SORT IT OUT YOURSELF

With our help, of course. You can get all your files in good order with these different sorting routines

Joe Telford

Most computing books consider sorting from a mathematical viewpoint: 'How long does it take to sort a list of 2000 numbers into order?' We studiously work through the examples, but why? How often do we need to sort numbers into order? Even in real life the biggest list of numbers which we commonly need to sort is 13 playing cards! Most of the real sorting is actually done with lists of names, and with data associated with those lists.

Real lists are there for real reasons. Let's take a typical list, say members of a photographic society. What sort of information would we need about them? The first rule of database building is to write down what we want to do with the information. From this we can define the list of names and the other data associated with the list which we require.

For each person we might need:

1. Surname
2. Forename
3. Title (Mr, Ms)
4. Street address
5. Town
6. County
7. Postcode
8. Phone number
9. Subscription (Paid or Due)
10. Camera type
11. Interests

Anyone intending to use this for a real photo-society would probably need to alter some items or add a few more items. There are two mechanisms for holding such data; the first is to keep it on disc as a file of information. This is shown in figure 1. Figure 2 shows how that file would exist in the computer's memory.

Look at figure 1. If we have a list of 10

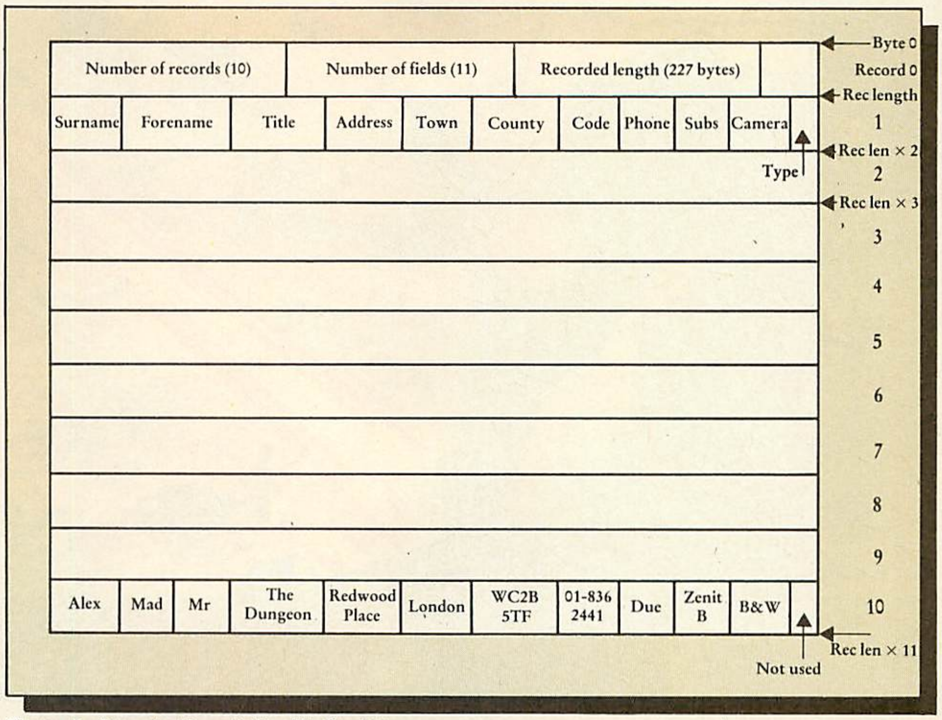


Figure 1. Organisation of disc file for data

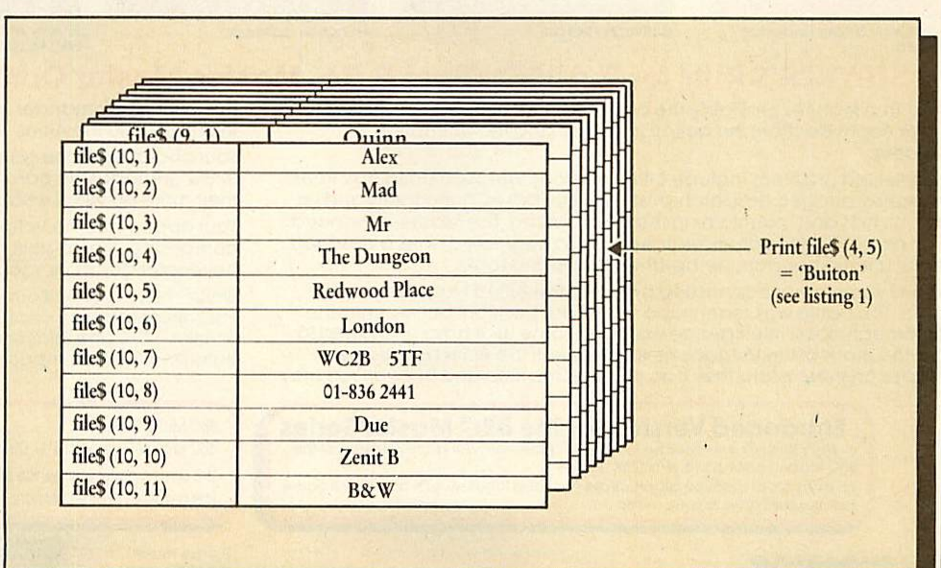
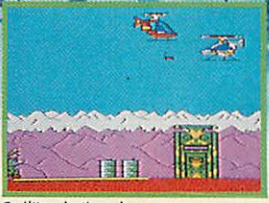


Figure 2. Same file in memory




Commander Stryker under fire in the city


Battling in the air


An action close-up


Enemy equipment (Enhanced BBC Master version)


A camouflaged Battle fortress (Enhanced BBC Master version)

STRYKER'S RUN for the BBC Micro B, B+, Master, Master Compact, and Acorn Electron

Stryker's Run features probably the best graphics ever seen on the BBC Micro or Acorn Electron; the action is intense and the animation is superlative.

The battlefield graphics include cities, edifices, wrecked buildings, trees, gravestones, bridges, despatch-posts, military bases, helicopters and jet ships, with hills and mountains in the background. The Master-enhanced version also includes statues, watch-towers, a neglected cafe, a deserted cinema, aircraft hangars, aeroplanes, trucks and tanks.

For many years, a war has ensued between the Allied Nations and the Volgans. The battle was reaching a stalemate position, but recently the Allies through good intelligence work and some luck have managed to obtain the plans of the Volgan's next offensive. If the Allied Forces can capitalise on these plans they can end the impasse and the war. You play the role of Commander John Stryker commissioned to take this top-secret information to the Allies' HQ.

Your character in the game can jump, run, duck, fire his laser pistol and throw grenades. He can also board aircraft and fly them, making use of their more powerful weaponry.

Your opponents, the Volgans, have a variety of weapons at their disposal comprising rifles, pistols, grenades, machine-guns, mortars, mines, helicopter gunships, rocket launchers and SAM missiles.

Stryker's Run is one of our most successful releases ever. It has topped the BBC Micro software charts for six weeks and received several glowing reviews: *"The graphics are stunning . . . This should be in every collection"* enthused A & B Computing.

Enhanced Version for the BBC Master Series

Stryker's Run is the first release to include a specially enhanced version for the BBC Master making use of its 128K of RAM.

An extra 40K of detailed graphics are provided together with additional game features and atmospheric music.

BBC Micro Cassette	£9.95	BBC Micro 5¼" Disc	£11.95
BBC Master Compact 3½" Disc	£14.95	Acorn Electron Cassette	£9.95

The screen pictures show the BBC Micro version of the game.
The graphics of other versions may vary.

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members, then the simplest way to keep that on disc is to arrange an amount of storage for each person's information. The information on each person is called a record, and each record in this file takes up 277 bytes. In fact if you were to write down all the details for yourself, you would find that you were using only about 120 bytes of information (one letter or space takes up one byte) so a good deal of the file is redundant.

When writing filing programs, I generally do a byte count of the longest record (say 140 characters) then add on 20 per cent just in case, then two bytes extra per individual item of data (11 items per person therefore 22 extra bytes). In the current example we could get away with 140 + 28 + 22 = 190 bytes per record. But because we will create each record from a DATA statement, which could hold 255 characters, we'll play safe and go for 255 + (11*2) = 277 bytes.

The different types of information for each person are in separate 'boxes' along each record. These are called fields, so this file has 10 records, each of 11 fields. Record zero is different to the others, because the information which it contains is different. It contains:

- The number of records in the file
- The number of fields in each record
- The number of bytes between records

The file is set up for random access; we can find any record simply by knowing its record number. For example, to read record number six:

- Open the file
- Read the file details
- Point to record six
- Read the record
- Close the file

To add a new record seven we follow similar steps:

- Open the file
- Read the file details
- Point to record seven
- Write the record
- Close the file

By reading and writing records like this, we can use the disc memory, although it's very much slower. We can load the database into memory if it is less than 200 records in length.

Once the file is read into memory, its format is different. It consists of a structure called an array, which has a name and two subscripts. The name which we chose was file$(record,field), the '$' indicating a string or text array. The two subscripts or indices, 'record' and 'field', help us to relate

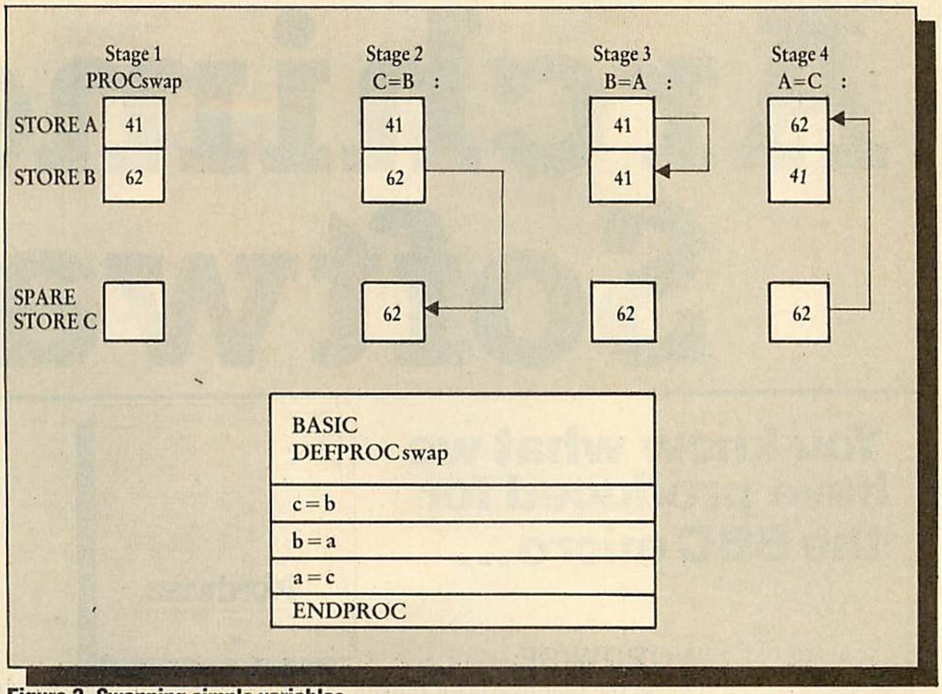


Figure 3. Swapping simple variables

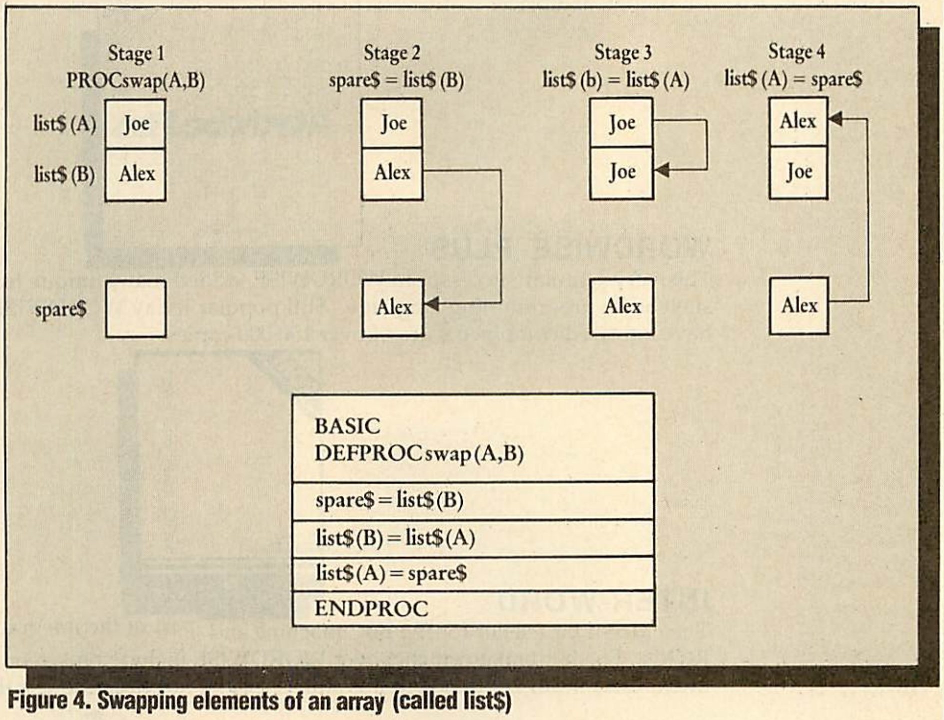


Figure 4. Swapping elements of an array (called list$)

the item in memory to its original place on the disc file. Look at figure 2. The item called file$(10,4) – 'The Dungeon' – is actually the same item as the fourth field in record 10 of figure 1.

Listing 1 in the yellow pages is the file creation program for the database. The first item of data is the number of fields in each record: change this if you want to use more than or less than 11 fields. Whatever this number ends up as, make sure that each of your records has exactly that number of fields. Also ensure that the last line of data simply contains the word '**END**'. This tells the computer that the last record has been encountered, so we don't need to count the number of records!

The first few lines of the program open the database file, which we call 'Clubdat' – ADFS users can give it a longer name like 'Club-data'. Then the key variables like record length in bytes, the initial record number and the number of fields are set up. The program then into a REPEAT ... UNTIL loop which moves the file pointer to the start of each record in turn, then reads an item. If the item isn't '**END**', then the procedure PROCtxtfields is called and the next 11 data items are read and transferred to file. When '**END**' is

encountered, the pointer is reset to 0 and the file details are transferred. The program ends by closing the file.

The program prints out the file as it transfers it – useful in the debugging stages, but tedious. If you like, remove any occurrences of PRINTitem$;"/";

Once the database file is on disc, the problem remains of accessing it, sorting it and printing it. This is performed by listing 2 on the yellow pages, which is the basis of the remaining programs in this article. This program is essentially in two parts, PROCreadfile and PROCaddressdata. PROCreadfile opens the disc file and reads its details. It then creates an array in memory called file$() and reads each item from the file into the array. It uses a little backward counting routine to indicate its progress in loading the file, and it concludes with an 'All read' message.

PROCaddressdata goes through the file$() array and prints out an address, followed by the other information on that person. Readers working towards their own databases should change this procedure depending on the number of fields, the content of each field and the actual print-out required.

There are two other procedures, PROCswap and PROCtime, and these will be used later on.

Starting to sort

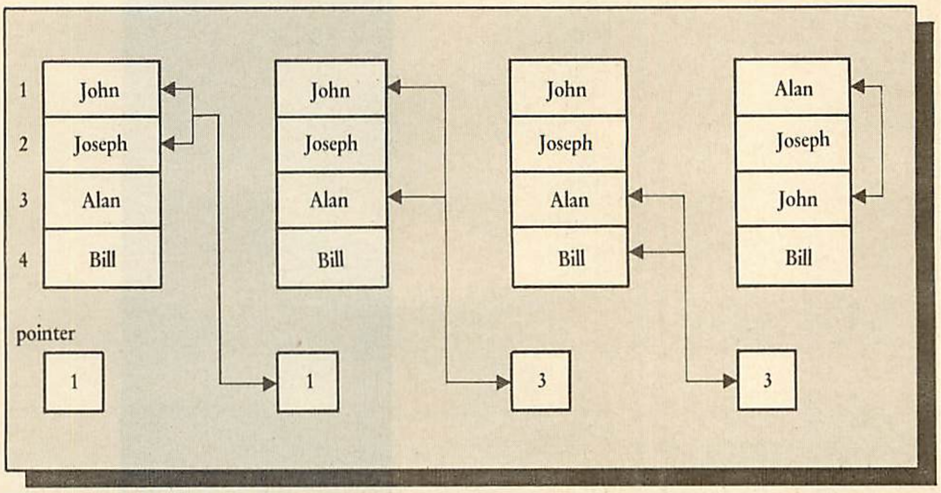
Try this. Get a pack of cards, separate all the diamonds and shuffle the 13 cards, then lay them out in front of you from left to right, face up. Now put them into order. OK? Well, now you know everything about sorting. No? Let's have a closer look.

There are two ways in which we could have sorted the cards. The first approach is to look at every pair of consecutive cards and, if they are out of order, swap them.

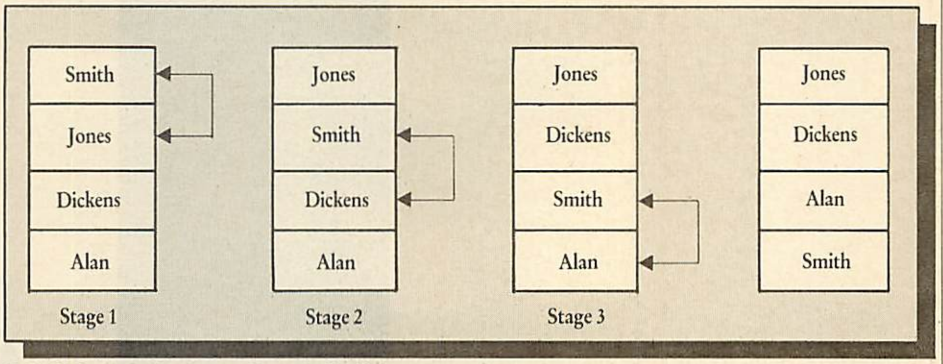
The other way is to make a second pile, by scanning the cards for the ace, moving that across, then scanning for the two. This speeds up as you go, as there are fewer cards left to scan.

Well, now that we've sorted the cards and seen how it's done, we can consider the two main elements of any sort. These are the comparison and the swap. The swap is a physical activity which takes a measurable time. For humans the comparison usually takes almost no time. Generally speaking, the mechanical task of re-ordering the list, along with the small chance of an error, means that a computer is better fitted for the task than a human being.

The swap is a fundamental element of any computer sorting. Figure 3 shows the stages for a simple swap of two numbers. Notice that three stores are used, one of which is a spare, used only for temporary storage. A more realistic task would be to swap two names, before sorting a list alphabetically. Look at figure 4. This shows how two elements in a string list can be swapped: notice that the list is called 'list$()' and the elements to be swapped are sent to the procedure as 'A' and 'B'. This is useful because the procedure can be used over and over, to swap any number of elements in the list. Notice too that the spare store must be a string, but while we are working within a list it needs only to be a single variable.



5 Exchange sort: single run through the list



6 Bubble sort: single run through the list

The database file is a two-dimensional array, made up of records and fields. If we are sorting the file, then whenever we swap an element, say a surname, the rest of the information for that record should also be swapped. Otherwise the information would get mixed up. To do this swap of all the information in a record, we use an array, 'spare$()', which can take every field of a record at one go.

Look at listing 2 again. The particular procedure of interest now is PROCswap. This transfers record 1 into the spare$() list, then record 2 into record 1, followed by the spare$() list into record 2. The time taken to swap 11 items, with 33 assignments per swap, is quite high in computing terms. Whichever sorting method we decide to use, we should bear this swapping time overhead in mind, because speed is often very important.

Listing 2 also contains PROCtime. This procedure simply prints out the time taken to sort the records into order.

Type in listings 3, 4 and 5 from the yellow pages. These each use a different method of sorting the array into order. Once all the programs are entered and saved on disc, load listing 2 and *SPOOL it into a file called 'BASE'. Type:

```
LOAD "PROG2"
RENUMBER 1000
*SPOOL BASE
LIST
*SPOOL
```

Now choose the kind of sort you want and load it, then add the base program:

```
LOAD "PROG3"
*EXEC BASE
RUN
```

When running the program remember that you may need to change the calling lines so that the sort occurs on the field you want. They are all set at the moment to sort on field 1, the surname, but if you wanted to

split the club into 'paid' and 'due' members, then simply sort on field 11.

Figure 5 and PROCexchange of listing 3 explain the way that the exchange sort works. Every time the program passes through the list it compares each item with the highest item found so far. If the current item is higher in order than highest so far, then the new item becomes the highest, and the pass continues. At the end of the pass (called NEXT loop2% in the program) the highest item is exchanged with the item at the top of the list. So we know the highest item is at the top of the list. Now all we need do is sort the rest of the list. Another pass begins, but starting one below the new top of the list, so that the next swap will be to the second position. This continues until the entire list is sorted. The table shows that even with a large number of items, the number of potential swaps is still quite small. The number of comparisons is much higher, but comparisons can be accomplished much more quickly than swaps.

We met the bubble sort when we looked at the card sorts. Figure 6 and listing 4 explain how this works. This sort is the easiest of all to write, and for a file of 10 records just consists of 10 passes through the 10 records, comparing and swapping consecutive records which are out of order. It is like the exchange sort – except that instead of comparing items to find the largest, then swapping the largest to the top, the bubble sort keeps swapping items, and the largest goes to the top automatically. This means that while the number of comparisons matches those of the exchange sort, the number of potential swaps is much higher, making the sort slower.

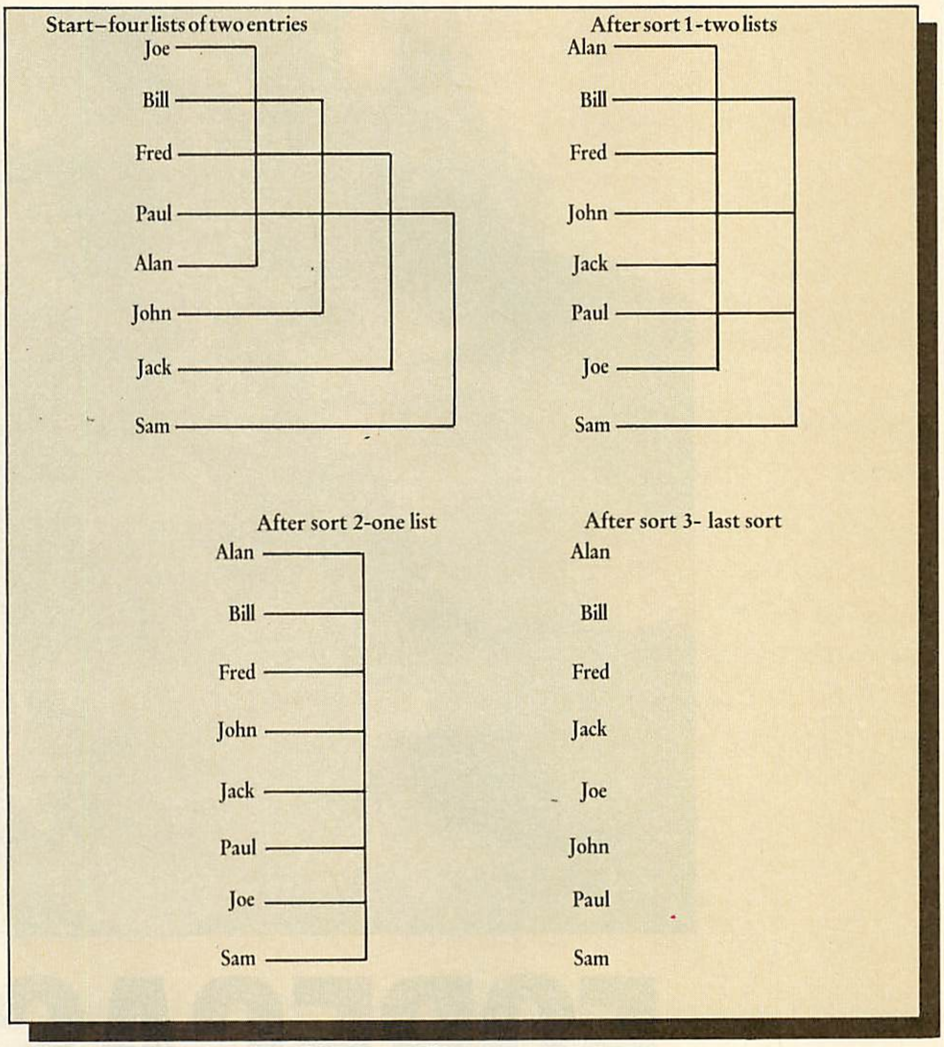
A third sort is the Shell-Metzner sort. This is one of my favourite sorts, because it reduces the number of comparisons and swaps to manageable levels with very large files. Unfortunately it is quite complex.

Let's play a game where we think of a number between one and eight. Providing you tell me whether I'm higher or lower with each guess, I can always find the number in three or fewer goes, because I become twice as precise at each turn. This is a good analogy of how the Shell-Metzner sort comes to terms with long lists of items to be sorted; by splitting them into shorter lists, each of which can be speedily sorted.

Look at figure 7. Imagine a list of eight elements out of order. The Shell-Metzner sort subdivides this list into four lists of two. These four lists can be easily sorted with a single swap. Next the part-sorted lists are made into two lists of four elements each, and because they are already part sorted, each list is placed in order quickly. The last stage is to combine the four-element lists into one eight-element list. Again sorting is performed quickly, because the list is already partly sorted. The impressive thing about the Shell-Metzner sort is the low number of comparisons which have to be made. While in short lists the number is little different from the bubble or exchange sorts, as the list size increases, so the number of comparisons reduces when compared with the other sorts. The maximum number of potential swaps is the same as the number of comparisons and in many cases the Shell-Metzner sort may be the fastest one.

The timing procedures in the sort programs are intended to enable readers to test the sorts and find which is fastest. Of course, using a file of 10 items is kids' stuff for all these sorts, so listing 6 is included to create a file of 100 random records (numbers in string format) of 11 fields. Try the sorts on these numbers and make a list of which perform best at small and large file size. Be prepared for some surprises; I was perplexed until I realised just how long it took to swap 11 fields. Compared to that, comparison time is almost negligible.

Remember though, these tests are for files in memory. Once we get to very large disc files, another picture appears – but that is another Jotting!



7 Shell-Metzner sorting of an eight element list

HOW THE SORTS COMPARE

	Exchange sort		Bubble sort		Shell-Metzner sort	
Items	Comparison	Max swaps	Comparison	Max swaps	Comparison	Max swaps
2	1	1	1	1	1	1
4	6	3	6	6	5	5
8	28	7	28	28	17	17
128	8128	127	8128	8128	769	769



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FORECASTS BY FAX

Weather forecasts are broadcasts on short-wave radio, and only simple equipment is needed to receive the fax signals

Terry Morris

Short-wave radio abounds with an enormous variety of signals, and among the expected clutter of political broadcasts, embassy teletypes, amateur transmissions and static there are a few surprises. Weather Fax is one – pictures on the radio.

Weather Fax is widespread, has a common protocol and is the closest competition which radio can offer television. Transmissions contain picture data, mostly maps, interspersed with the occasional satellite photograph. These Fax broadcasts are provided on a 24-hour basis by both military and national meteorological services for the benefit of the airborne and maritime transport industries. In the United Kingdom, this service is provided by the Meteorological Office.

Weather Fax pictures give a wide variety of weather data and are particularly useful within the school or college curriculum, lending a welcome dynamic aspect to the study of meteorology, climatology and related subjects. As little as four hours can lapse between successive picture updates, and the maps can provide a detailed synoptic view of shifting weather patterns. What is more, the data is free!

Fax signals are easy to receive and decode. You don't need a complicated aerial system, only a short-wave broadcast receiver and some simple additional electronics. Picture data can be easily downloaded using a BBC Master 128 or BBC model B fitted with shadow RAM.

There is often a considerable similarity in the output of various Weather Fax stations, although they can and do offer

various maps for specialised purposes.

A Significant Weather Prognosis is a product common to most stations – it provides data relating to wind velocity, cloud top and base heights, cloud types, thunderstorms, clear air turbulence, fronts and so on. Both air and maritime traffic would be able to make good use of this type of data. Aircraft, for example, would do well to avoid turbulent areas, where buffetting can make life very unpleasant. Figure 1 shows Australia in for some quite spectacular weather on January 28 this year – Darwin, for example, having its own private thunderstorm.

A Mean Sea-Level Analysis (figure 2) is an old favourite, quite familiar from the television weather report. Typically it shows isobars and the broad movement of weather fronts.

Other products typically include neph-analysis (cloud cover), swell-wave analysis and upper air analysis and forecast, the latter being of special interest to pilots. To complete the service, many stations also broadcast a timetable of map transmissions, with times usually given as GMT.

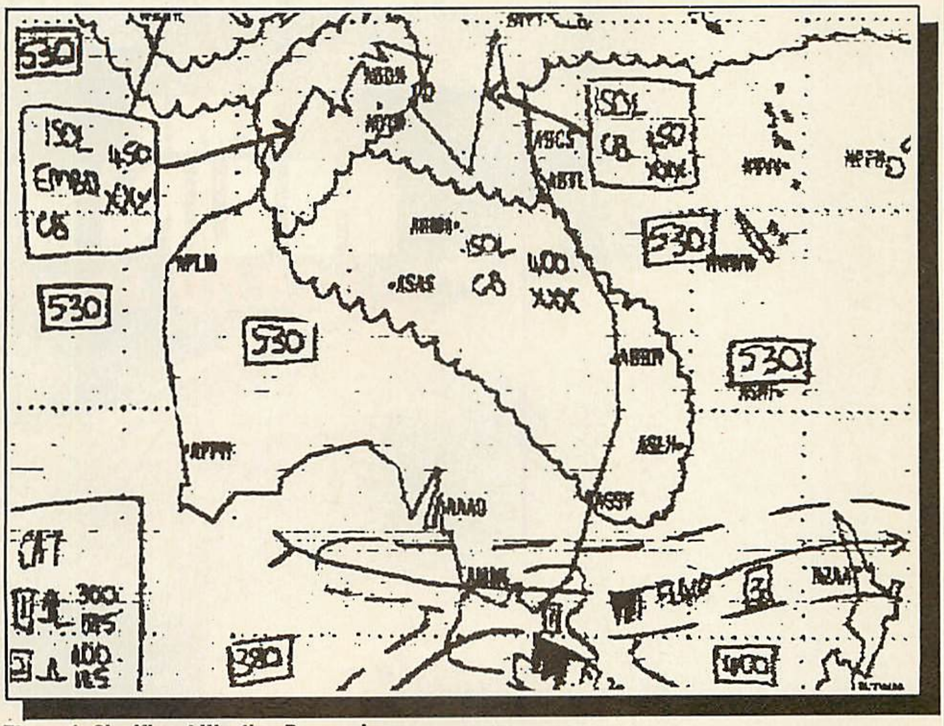


Figure 1. Significant Weather Prognosis

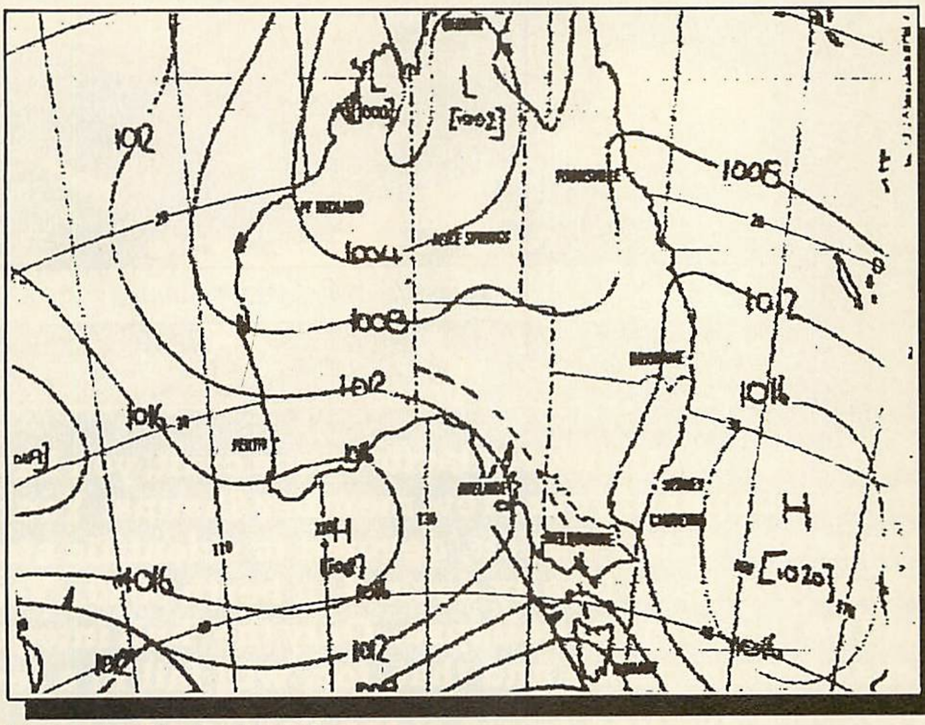


Figure 2. Mean Sea-Level Analysis

Black and white

Most Weather Fax transmissions are to be found scattered through the short-wave radio spectrum (2000kHz to 30MHz). Only black and white pictures are involved and therefore only black and white data need be included in the transmission.

The most common broadcast technique appears to use the upper sideband (USB) of the carrier which is frequency modulated with a typical total shift of 800Hz, the higher frequency representing white in the picture. With a radio switched to USB operation, the two frequencies appear as distinctly separate audible tones.

The general technique for Fax transmission is shown in figure 3. The original picture is wrapped around a drum which is rotated once every half-second. Picture transmission is preceded by a continuous low tone, followed by a loud 'blurt' and then about 30 seconds of synchronisation pulses in which a continuous lower tone (represented by black) is broken by pulses of higher pitched tone (white) – the ratio of black to white is about nine to one. The white to black transition represents the synchronisation pulse.

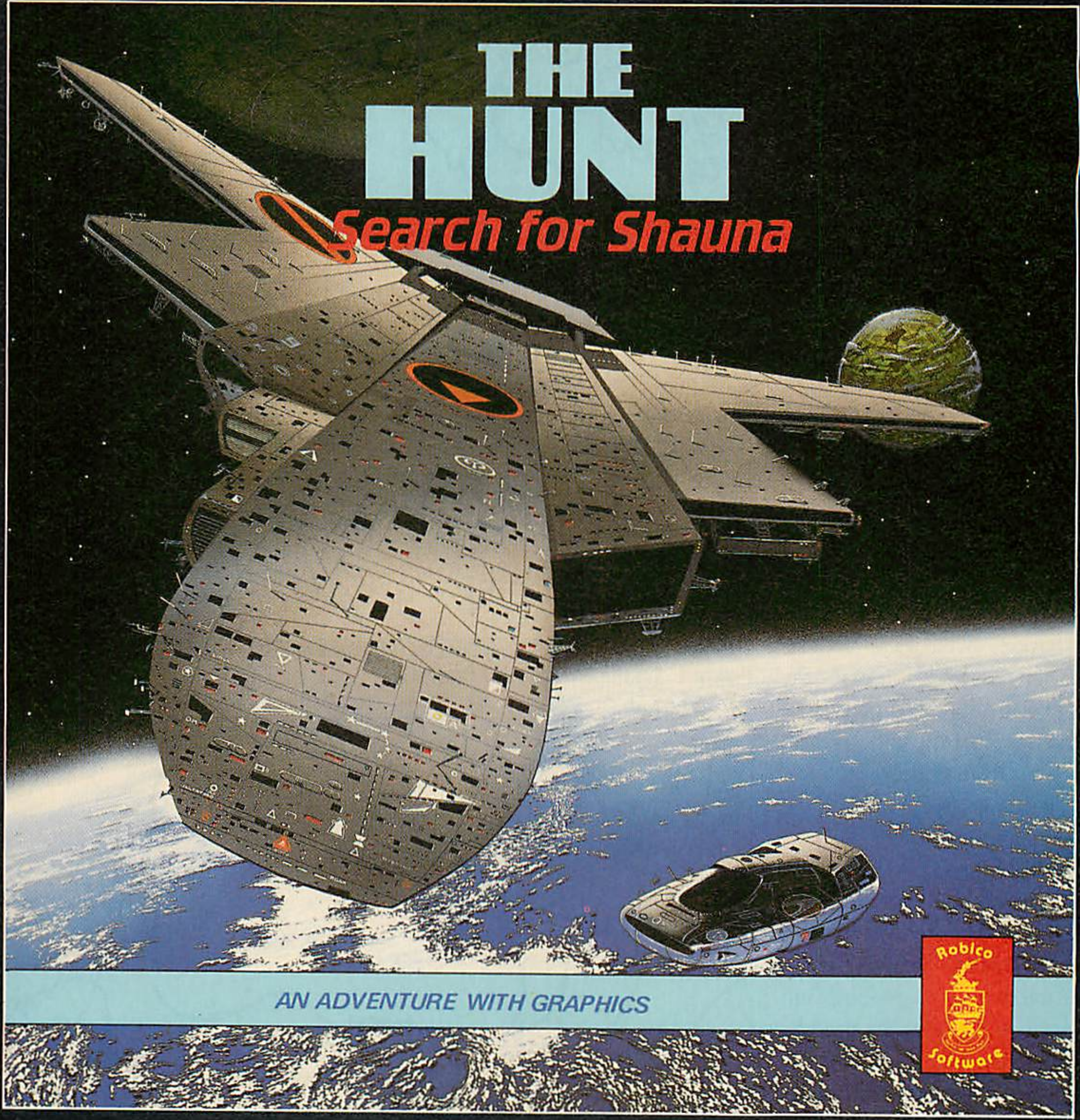
A photocell is aimed at the rotating drum, and it detects the difference between the black lines and the white background as the drum spins. As the drum rotates, the photocell gradually scans lengthways along the drum. The photocell signal is used to frequency modulate the carrier wave.

Digital data transferred by frequency modulation of a carrier is a common technique known as frequency shift keying (FSK) – a version of the idea is used by all BBC micros to store data and program on cassette. Weather Fax pictures are made up of 1080 lines and a total of nine minutes are required for the complete transmission of a map. Completion of the picture is signalled by a further loud 'blurt'.

No information concerning the proportions of the picture is transmitted with Weather Fax. The Index of Co-operation (IOC), defines how the picture is proportioned. The IOC divided by the width in inches gives the number of scan-lines per inch – conventionally it is equal to about 576. So if a picture is 12 inches wide, there are 576/12 or 48 scan-lines per vertical inch. A glance at the sample pictures will, however, reveal that they are slightly 'tall' and it illustrates the practical difficulties in exactly matching the IOC of the computer system with that of the transmitter.

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Writing the program

On the programming side, the first job of any receiver program is to recognise the regular 0.5 second synchronisation pulse. Once a valid sync pulse is found then the program must immediately proceed to line scanning so that synchronisation is not lost.

Each line of picture takes 0.5 seconds to broadcast. On a mode 0 screen, each line can be sampled 640 times within this time. That means one sample every 780 microseconds or so.

Rapid sampling requires the use of machine code and the program is most efficiently written if it is interrupt driven. The T1 timer of the user 6552 VIA can be used to generate interrupts after an interval which corresponds to the sample interval. The service routine, which should be placed in the main interrupt vector IRQV1, can then check the user port data and write the point to the screen.

Because the BBC Master is not a dedicated Fax receiver there are a number of pitfalls to watch out for.

- Other interrupts may delay the sampling, so disable all unwanted interrupts by writing to the system interrupt enable register at &FE4E. Be sure not to forget to re-enable it at the end of the program!
- ROMs get a service call during execution of an interrupt service routine. To avoid this disable all unwanted ROMs for the duration of reception; this is important as some of them can keep the machine occupied for a considerable time.
- The absolute value of the interrupt timing and signal synchronisation depend upon the computer's crystal oscillator. Unless you are very lucky, you will find that your Fax picture will tend to drift to one side because the Fax transmitter doesn't quite agree with the micro about absolute time. You can adjust the interval between sampling interrupts by an infallible method known as trial and error.

The following steps represent the backbone of the author's Fax decoder program:

- Allocate sideways RAM areas 4, 5 and 6 for data with *SRDATA
- Select mode 0
- Reset vectors
- Wait until a valid synchronisation pulse has been found
- ignore the next 60 lines which contain the remaining sync pulses and some useless picture information
- Record 256 lines of picture at 840 dots per line
- Switch to shadow screen and record another 256 lines

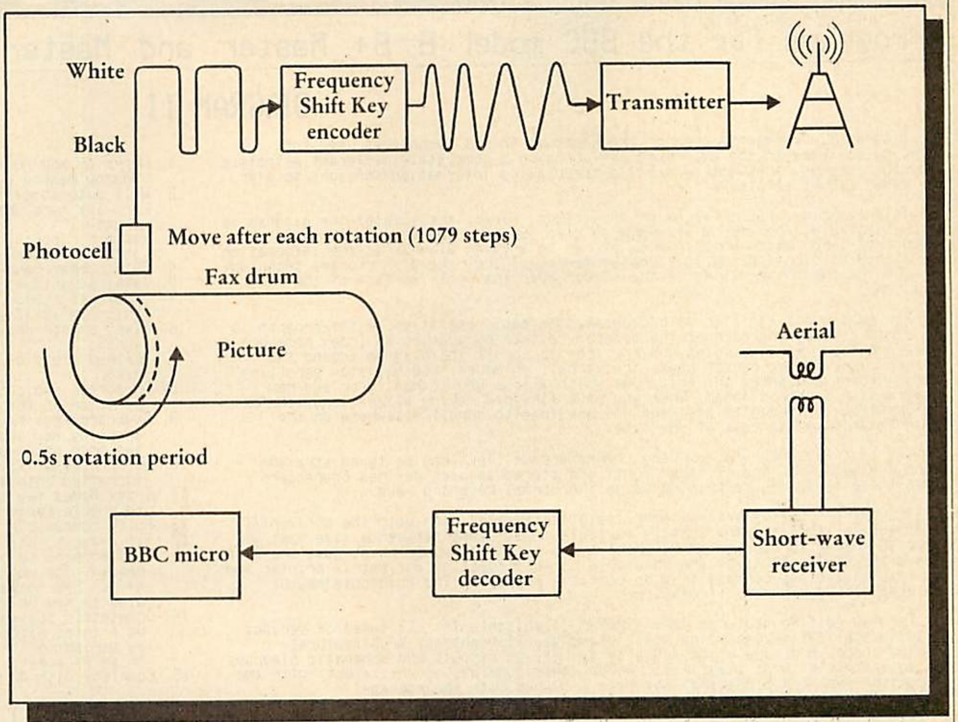


Figure 3. Principles of Weather Fax transmission/reception

- Transfer both screens to sideways RAM
- Clear both screen and shadow screen data areas of all data
- Record another two screens into the normal and shadow memory as above
- Write the picture to disc. Save the sideways RAM first, then the normal and shadow screens.

This program will record 1024 of the 1080 lines of Fax picture data. Losing the extra will not normally be important.

WEATHER FAX FREQUENCIES

GFA service	
3289.5 kHz	24-hours
8040.0 kHz	24-hours
11086.5 kHz	24-hours
4610.0 kHz	18:00 to 06:00
14582.5 kHz	06:00 to 18:00
GFE service	
4782.0 kHz	24-hours
9203.0 kHz	24-hours
14.436 MHz	24-hours
2618.5 kHz	18:00 to 06:00 winter
	19:00 to 05:00 summer
18.261 MHz	06:00 to 18:00 winter
	05:00 to 19:00 summer

The Weather Fax service is provided by the Meteorological Office, and is broadcast from Bracknell. The GFA provides general weather information; GFE is more concerned with the upper air and is particularly applicable to aviation. All times are GMT.

What's required to receive Fax?

You will need the following equipment:

Aerial: a half-wave dipole, preferably fitted with a matching transformer or balun, and 50-ohm feeder cable.

Receiver: if you have limited funds, then go for a sensitive short-wave receiver capable of upper sideband reception. A digital frequency display is useful. All of the pictures accompanying this article were received on a Grundig Satellit 3400. This model is not available in the United Kingdom; its nearest equivalent is the Satellit 650, and there are other similar models.

Fax transmissions are scattered across the short-wave spectrum and are thus not confined to the amateur bands. Many good quality receivers are built to sweep only the amateur bands, but most Fax transmissions lie outside them.

For those to whom money is no object, then one of the latest microprocessor controlled receivers, such as the Yaesu FRG-8800, would be ideal because they provide fine-tuning control coupled with broadcast capability. They also possess low drift which is ideal for pre-programmed recording of weather data as they can be tuned beforehand and won't drift off stations. Also they can be fitted with an RS232C serial interface, thus permitting computer control. Many Fax stations transmit simultaneously on several different frequencies; a computer can be programmed, for example, to select and read the signal strength of each of those frequencies and therefore make a decision to record from the strongest.

PINEAPPLE SOFTWARE

Programs for the BBC model B, B+, Master and Master Compact with disc drive

DIAGRAM II

Diagram II represents a major breakthrough in the techniques used for drawing software on the BBC micro. It works on a completely different principle to other drawing software by storing the drawing information straight to disc as coded 8*8 pixel blocks.

This technique has three major advantages. First, the size of the diagram is only limited by the amount of space on disc. Second, there is no limit to the amount of information which can be stored on a given diagram as the information is stored on disc and not in computer memory. Third, the disc storage technique allows the smooth scrolling of the screen over the whole surface of the diagram.

For people not familiar with Diagram, the basic operation of the program is to first display any part of the diagram, either by quoting an index name or screen number. At this point you are free to scroll the diagram around the screen using either cursor keys, trackerball or mouse. You may stop scrolling at any point and enter the edit mode which allows you to modify or add new information to the diagram. When you have finished making alterations, the new information is stored to disc and you are free to scroll elsewhere on the diagram stopping to edit at any time.

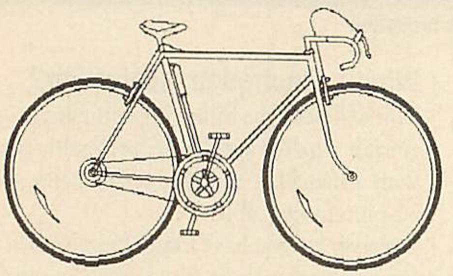
The edit features are now very comprehensive. Text may be typed straight from the keyboard, and if other fonts are stored as user defined characters then these fonts may be printed using the normal keyboard keys.

The print routines are now completely 'scaleable' with both the horizontal and vertical scales being totally variable in 1% steps between a size that will give 18 mode 0 screens on an A4 sheet and a size that would print just one pixel on a sheet! The routines are adaptable to most types of dot matrix printer and full advantage may be made of wide carriage printers. The printouts may be rotated through 90 deg. if required.

The new editing features make DIAGRAM II suitable for all types of serious drawing application including scale drawings, flow charts, architectural, family trees, and many other subjects as well as circuit and schematic diagrams. As an example of what Diagram II can do, this complete advertisement (with the exception of the PCB drawing) has been produced with the package.

SUMMARY of DIAGRAM II FEATURES

1. Works on any model BBC computer with either DFS or ADFS. (ADFS only if Shadow memory available).
2. Will automatically take advantage of shadow memory (any make) to provide more User Definable Characters, 880 with Shadow, 381 without Shadow.
3. Rapid horizontal and vertical line drawing routine with automatic joins for circuit diagrams.
4. Full rubber band line drawing and circle drawing modes.
5. Takes advantage of the Acorn GXR rom to provide drawing of arcs, sectors, chords, parallelograms, ellipses, and flood filling. Note this rom is already fitted to Master and Compact machines.
6. Pixel cursor drawing and deleting mode allows very fine detail to be added.
7. Defined areas of screen may be moved, copied, deleted or saved to disc.
8. On-screen indication of cursor position shows either the cursor position on the overall diagram or the distance from a preset point.
9. Keyboard keys may be predefined to print User Defined Characters, enabling new character sets to be stored as user defined characters and then printed straight to the screen using the keyboard keys.
10. Wordprocessor files may be loaded to the screen and automatically formatted into any shape screen area.
11. Index names may be set up to point to given areas of a large diagram, to enable rapid access to a given point on a diagram.
12. Fully compatible with Marconi trackerball and most makes of mouse.
13. All Diagram 'Utilities' are included, enabling screen ident numbers and borders to be added, and any area of diagram to be moved or copied. The whole diagram may be displayed in reduced scale (either 4*4 or 8*8 format) on a single screen, and the size of the overall diagram may be increased or decreased.
14. Completely scaleable print routines allow any area of the diagram to be printed either horizontally or through 90 deg. in scales that may be varied in 1% steps allowing up to 18 mode 0 screens to be printed on an A4 sheet (still with readable text).
15. Complete with 40 page easy to understand handbook.



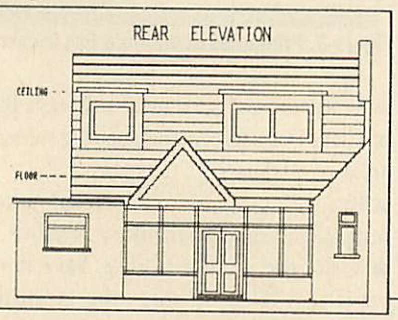


Diagram II consists of a set of disc files and a 16k Eprom. The disc supplied is formatted in 40T on side 0 and 80T on side 2. Please state if this is unsuitable for your system, or if you require a 3.5" Master Compact disc.

DIAGRAM II — £55.00 + vat

P & P free (except overseas)

N.B. Upgrades are available to existing Diagram owners. Please contact Pineapple if you have not received an upgrade letter.

PCB

Pineapple's now famous printed circuit board draughting aid produces complex double sided PCB's very rapidly using any model BBC micro and any FX compatible dot-matrix printer.

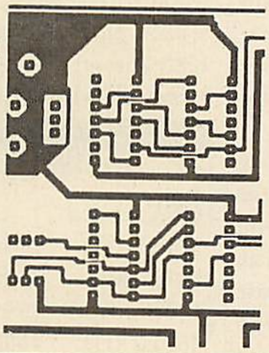
The program is supplied on Eprom and up to 500 component and 500 ASCII component descriptions may be stored for each PCB. There is no limit to the number of tracks that may be stored for a given PCB although the maximum board size is restricted to 8" * 5.6".

Using a mode 1 screen, tracks on the top side of the board are shown in red, while those on the underside are blue. Each side of the board may be shown individually or superimposed. A component placement screen allows component outlines to be drawn for silk screen purposes and component numbers and outlines entered on this screen may be displayed during track routing to aid identification of roundels.

The print routines allow separate printouts of each side of the PCB in a very accurate expanded definition 1:1 or 2:1 scale enabling direct contact printing to be used on resist covered copper clad board. The print routines are very fast taking typically 5 minutes for a 1:1 print of a 7" * 5" board.

This program has too many superb features to describe adequately here, so please write or 'phone for more information and sample printouts.

PRICE £85.00 + vat



PCB PLOTTER DRIVER

A new addition to the PCB software is the PCB plotter driver program. This enables files produced by PCB to be used in conjunction with most types of plotter to produce plotted output rather than the normal dot-matrix printer output.

In this way plots may be produced directly onto film or even directly onto copper board with an etch resistant pen if a suitable plotter is available. The program is suitable for use with most makes of plotter including Hewlett Packard, Hitachi and Plotmate M. The program can also be configured to work with other plotters by entering suitable plotter instructions.

All the features of the printer driver are included, such as the automatic thinning down of tracks between roundels. Mirror image plots are also available.

PRICE £35.00 + vat

MARCONI TRACKERBALL

This high quality device comes in three versions. Version one is for the standard BBC micro and comes with the Icon Artmaster drawing package from Micro-Draw, and Trackerball Utilities which allow the trackerball to be used with other software.

Version two is for the Master 128 computer and this comes with the Pointer Rom. This is a Rom which allows the Master to be configured for use with the Trackerball and has commands to enable the Trackerball to intercept the cursor key or joystick routines of other software. Commands are also available to reverse the axes of the trackerball and set the sensitivity. The three buttons may also be set up to produce any ASCII code.

Version three is simply the bare Trackerball which comes without software but is suitable for use with specially written software such as Diagram or Diagram II.

Trackerball adapters are also available which plug onto the end of the cable and convert the connections of the trackerball to be the same as a mouse. This enables the trackerball to drive all types of 'mouse' software.

For Model 'B' and B+ (with Icon Artmaster)	£ 60.00 + vat
For Master 128 (with Pointer Rom)	£ 60.00 + vat
Bare Trackerball (no software)	£ 49.00 + vat
Pointer Rom - available separately	£ 12.50 + vat
Trackerball to mouse adapters	£ 8.00 + vat
Postage & packing on Trackerballs	£ 1.75

MITEYSPICE

Miteyspice is a very powerful AC & DC circuit analysis package with graphics suitable for use with any model BBC micro including those with 2nd processors.

As well as all the usual facilities available with this type of program, non-linear effects, small signal, noise measurements and sweeps may be performed. Component values may be swept, allowing component tolerances to be investigated as well as thermal performance etc. Comprehensive transistor modelling is incorporated using a 20 parameter Ebers Moll description. The program is supplied on disc with a very comprehensive 49 page manual.

PRICE £119.00 + vat

ADFS Utilities Rom — ADU

ADU is an invaluable utility for all ADFS users. It adds over 20 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more.

Copying of DFS discs onto ADFS discs can be made in one pass with automatic creation of the required directories on the ADFS disc. All functions are fully compatible with Winchester drives including *BACKUP which allows backing up of Winchesters onto multiple floppies.

Additional *commands include:- *ADU, *BACKUP, *CATALL, *CHANGE, *DFSDFS, *DIRALL, *DIRCOPY, *DIRDESTROY, *DIRRENAME, *DISCEDIT, *DRIVE, *FILEFIND, *FORMAT, *KILLADU, *LOCK, *MENU, *PURGE, *PWRBRK, *UNLOCK, *VERIFY, *VFORMAT.

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All orders sent by return

VISA

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Access

Frequency Shift Key Decoder: This is a simple circuit, often available in kit form (and even on a single chip) from electronic hobbyist suppliers. It converts the audible Fax tones to the TTL logic levels understood by the computer. Generally, the radio must be tuned so that the higher of the two tones registers at about 2300Hz. Hence a pitch-pipe tuning aid can be useful at this stage before a 'feel' is developed for the transmissions.

The decoder is typically powered from the computer (+5V and ground) and provides a TTL data output. The decoder gets its audio data from the receiver's speaker output while the data connections can be made to the micro's user port.

A BBC Master 128k or model B fitted with shadow RAM: The Master is a most useful machine for Fax reception. The incoming picture can be brought in as a real-time display, and broken into four mode 0 screens of data (80k of data in total). The presence of the real-time clock is an added bonus because it can be used to create a pre-set recording facility. Furthermore, the presence of the ADFS means that as many as seven pictures can be saved onto one disc without recourse to any screen compression techniques, using the 640k large format.

The model B/shadow RAM combination can be used to store 40k of mode 0 picture data but suffers from the disadvantage of being able to store only one line in two of the picture.

Information about transmissions

Once the hardware and software are in place, it is still essential to know where to look for the data. Information for the UK is given in the box above. Overseas, write to your national meteorological service for information. They should oblige with a list of frequencies, a timetable and perhaps a brochure describing the Fax products which are available on short wave in your own electronics.

Your local hobby store is another possibility because you will almost certainly find books which contain lists of Weather Fax stations and frequencies upon their shelves, or someone there to ask advice from.

Using weather maps

The weather maps you get from the radio can be used in a variety of ways. The Weather Fax system arose as a method of sharing data between meteorological stations across the country, but the same data is available for other users too.

At present one of the largest groups of making use of Weather Fax are sailors; marine receivers are available that allows yachtsmen to produce their own weather maps while at sea, so they can take advantage of any wind shifts and avoid approaching storms.

Within a school, a Weather Fax receiver should not be beyond the ability of a science department to construct. The interpretation of synoptic charts such as those broadcast on the GFA service from the Meteorological Office at Bracknell is a common exercise for teaching geography at the fifth-form level or above, and the immediacy gained from using the regularly updated charts should prove highly motivating for students.

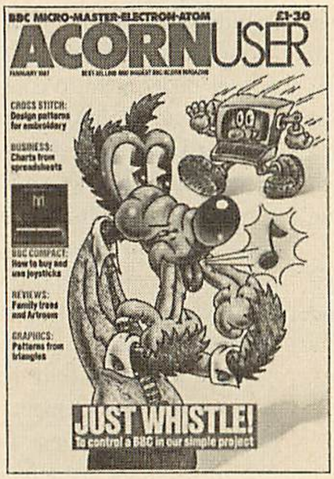
Many thanks to John King for his help, advice and encouragement.

Further details about a fully documented Fax program are available from the author at Edgecombe College, College Road, Edgecombe, Bay of Plenty, New Zealand.

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GAIN CONTROL

Here we present an introduction to the principles of computer control with the help of *Switch*

Peter Julian



The BBC micro can be used to control all manner of mechanical and electrical devices – robots, for example, or lights. It can also take information from external sensors, such as light detectors or switches, and use it to decide what to do.

This input and output is often achieved using the computer's user port for receiving data, and the printer port for sending it. In order to use the tiny signals from the computer for anything useful you need an interface unit, such as the Banana interface, which amplifies the signal from the computer. Learning the principles of computer control can be unnecessarily complicated by the technicalities of programming, so here is a program, designed to teach the principles involved. It can also actually be used to control a device when the ideas involved have been grasped, so it is especially suitable for educational use.

ILLUSTRATION BY MICKEY FINN

The hobbyist who wishes to extend his or her programming expertise into the field of robotics should also find the program, *Switch*, a good starting point. Because *Switch* is written in Basic, it is fully extendable with no machine code to worry about. The ready-made functions and procedures can be put together to build more complex routines, or extra facilities can be added by adding new procedures.

Switch forms a good basis from which to begin learning control because it demands tidy, structured programs right from the start. The program has been designed so that children should find it simple – using procedures means that the programming logic puts emphasis on the correct sequencing of command words, and it can be readily used in problem solving involving control technology.

In fact, *Switch* is two programs. The first provides a simple introduction to control, via programming traffic lights or a pedestrian crossing.

Unlike some other control systems, there are no hidden or inaccessible parts. All the routines can be examined to see how they work. This should assist the student who wishes to improve their understanding of how the routines operate.

New facilities

It is possible to create completely new facilities to add to the procedures already built in to *Switch*. For instance, a new function could be added to read the analogue port. Light-dependent resistors or other sensors can be connected, and will increase the versatility of the control system. Initial experiments with the analogue port could involve instructing the computer to make different responses according to the light level measured by a light-dependent resistor.

Each of the programs has a display showing the current state of the outputs from the computer – whether they are on or off. The output routines are all in Basic, and can be modified if necessary. There is no display on screen showing the current state of the inputs used by the program, as continually updating the input display would involve a complex interrupt routine in assembly language. Producing this type of input display could form part of a more advanced programming project.

Traffic lights

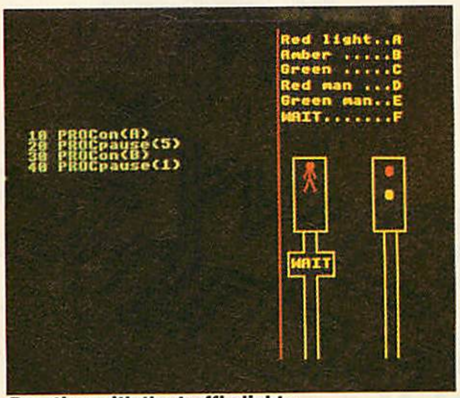
Listing 1 on the yellow pages is a simple introduction to the *Switch* language. This is entirely screen-based, and doesn't need an interface unit or any external equipment. It uses similar output-switching commands as the more advanced version which will be described later and the logic of working out a sequence using pause and repeat commands is the same. Correct programming of the lights depends on good observation. This should encourage children involved to discuss how to find the correct sequence.

Type in the listing, being careful to keep the line numbers as they are in the yellow pages. It may be simpler to type in the lines from line 1000 first, then add the first 10 right at the end. When run, the screen shows a traffic light and a pedestrian crossing, which can be programmed by typing into the green text area (see picture).

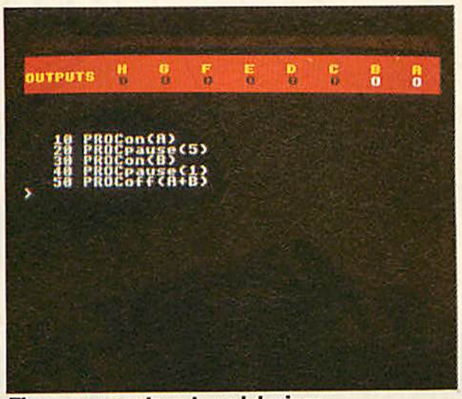
Programming the lights can be done in three stages. First, the traffic light can be programmed as an ordinary traffic light. Then you could try to program the traffic light and crossing sign to work with each other. The sequence is different from a normal traffic light. Third, use REPEAT routines to produce flashing lights and bleeping sounds. You could convert the REPEAT routines to procedures.

It is helpful to draw a flow chart before typing in the commands.

To switch on an output such as the red light, the PROCon command can be used,



Practice with the traffic lights



Then move on to external devices

followed by the letter name of the output. The red light is output A, so the first line of the program could be:

```
10 PROCon (A)
```

The function keys are pre-set with several of the most common commands. These are marked on the function key strip. The red keys can be used to reduce the amount of typing to a minimum.

If more than one output is to be switched on at one time, then:

```
10 PROCon (A + B)
```

can be used.

To switch off an output, PROCoff can be called in a similar way to PROCon:

```
10 PROCoff (A + B)
```

switches off both the red and yellow lamps.

Any commands to switch on an output that is already on are ignored. If more than one output is to be switched on, and any one is already on, then the command is ignored. So:

```
10 PROCon (A)
20 PROCon (A + B)
```

will not switch on lamp B. The same effect also applies to PROCoff.

The third vital procedure is PROCpause. This allows the program to wait for a preset time, to introduce a delay between actions. To wait for five seconds, you can use:

```
10 PROCpause (5)
```

To program the simplest traffic light sequence, first run listing 1 and then type in the program in box 2. Then run it by typing RUN or pressing the function key.

Other procedures

Listing 1 offers several other procedures to control the lamps. PROCreset will switch off all the outputs. It can be used within a program, or it can be used if a program has to be stopped half-way through by pressing Escape. This can leave some lamps on, so PROCreset sets them all to off. If you are using *Switch* with an interface unit, to control a buggy or turtle for example, pressing Escape may leave the motors running. However, pressing function key 0 uses PROCreset to avoid this problem by stopping all the motors.

PROCbutton causes the program to wait until the space-bar is pressed. This is vital because the pedestrian crossing sequence should only start when a button by the roadside is pressed. PROCbeep makes a beeping sound to simulate the crossing.

The functions of the red keys are printed on the keystrip. With commands such as PROCon, the command and first bracket appear on screen, but you have to type in the letters corresponding to the lights to be switched plus the closing bracket yourself. Some other commands such as PROCbeep don't appear on the keystrip, and have to be typed in full. If you make a mistake typing in a line, just type it again.

Interface unit

The advanced version of *Switch*, in listing 2 on the yellow pages, offers the same set of procedures as the traffic light program, plus other facilities. The first is PROCtest, which can be called by pressing function key 9. PROCtest allows the input sensors to be checked – an on-screen display shows which inputs are on and which are off, and this should change if the sensor switches are changed or light-dependent resistors are shaded. To end the test, press the space bar. PROCtest should not be used with a program, just for debugging.

In contrast, FNinputon is a function to test whether a particular input to the interface box is on or off within a program. This is usually incorporated into a Basic 2 statement such as:

```
10 IF FNinputon (A) THEN PROC
beep
```

This will cause a beep only if input A is on. Unlike PROCon, this can't be used with more than one input. If two inputs are on then use:

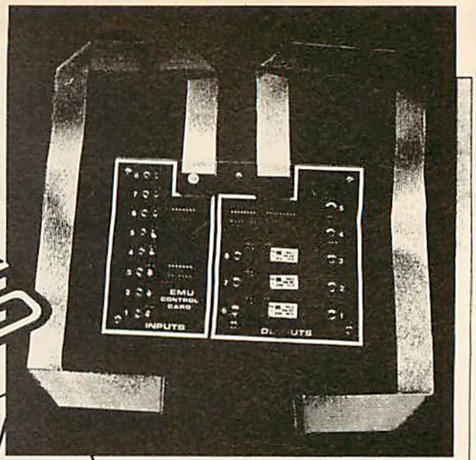
```
10 IF FNinputon (A) AND FNinp
uton (B) THEN PROCbeep
```

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An exciting development in the field of educational microelectronics. Unlike other 'push together' systems boards with limited flexibility, you'll find the OFFBOARDS truly open-ended, ideal for design problem solving. They provide an essential stepping stone to the complexities of pure breadboarding. With the OFF-BOARDS you can introduce a component-based approach without the usual drawbacks of lost time on simple wiring faults. Each of the ten OFFBOARDS consists of a small PCB with a set of Veropins fitted to one end. These can be pushed into a standard I.C. type breadboard, and powered up to provide a useful systems function. The Veropins of the OFFBOARDS mate with the sockets of the bread-board, and pupils can investigate the circuits sub-systems by using the breadboard to interconnect and adding components.

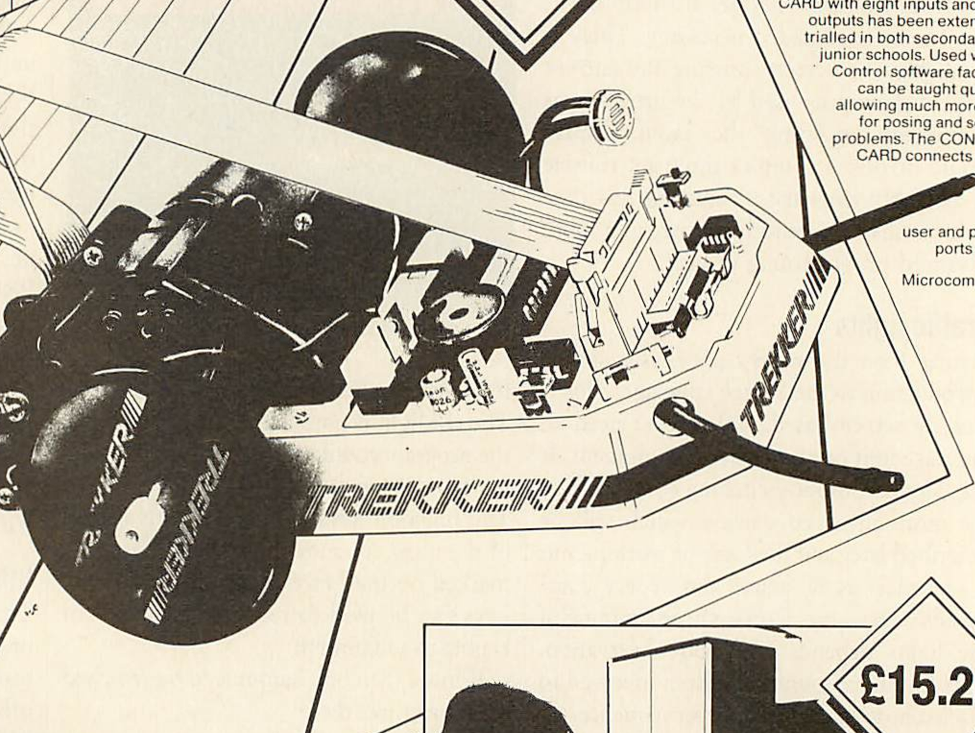


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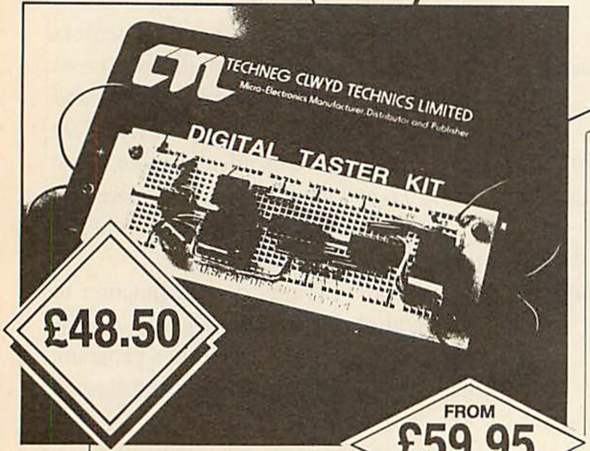
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Another very useful tool for problem solving exercises and computer control studies, the CONTROL CARD will shortly be available alongside other group products. Ideal for introducing the computer as a device controller, and solving problems in a control environment. The pcb CONTROL CARD with eight inputs and eight outputs has been extensively trialled in both secondary and junior schools. Used with In Control software facilities can be taught quicker, allowing much more time for posing and solving problems. The CONTROL CARD connects to the user and printer ports of the BBC Microcomputer.



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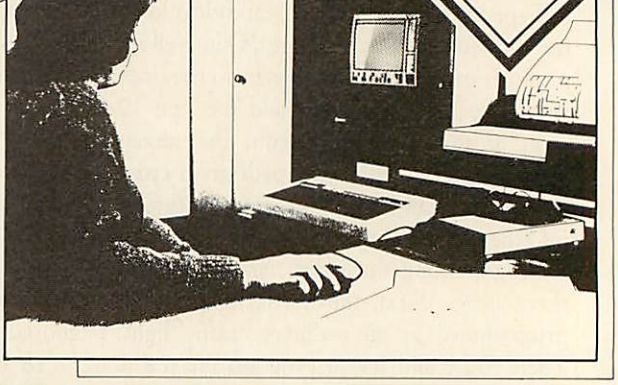
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FNout is similar, but it allows you to test whether a particular output is on or off.

Combined with REPEAT and UNTIL, these functions can form a wait command:

```
10 PROCon (C)
20 REPEAT UNTIL FNinputon (A)
30 PROCoff (C)
```

This keeps output C on until input A comes on, then C is switched off. So this sequence could control a buggy motor for example, driving the buggy forward until it hits something. Most buggies have a bumper on the front which can detect when something is hit, and the input from the bumper could then be used to turn the motor off.

Another application for REPEAT would be to sound a warning:

```
10 REPEAT
20 PROCbeep
30 PROCpause (0.5)
40 UNTIL NOT FNinputon (A)
```

The beep keeps repeating at half-second intervals until the input A is not on.

Function keys 7 and 8 are used in FOR loops. Key 7 starts the loop – all that has to be added is the number of times the loop should run. So to beep five times, the following should be used:

```
10 FOR x = 1 TO 5
20 PROCbeep
30 PROCpause (0.2)
40 NEXT
```

NEXT appears on function key 8.

Procedures

As *Switch* is written in Basic, all the facilities of Basic are available for constructing your own procedures. These can comprise facilities we've already described, or they may be more sophisticated, perhaps to allow access to the analogue port. The beeper loop above can be rewritten as a procedure like this:

```
1000 DEF PROCbeeper
1010 FOR x = 1 TO 5
1020 PROCbeep
1030 PROCpause (0.2)
1040 NEXT
1050 ENDPROC
```

The definition of the procedure must come after the main part of the program, so it's best to use line numbers from 1000 upwards. This procedure idea can be tried out within the pedestrian crossing sequence to give the noise made by a pelican crossing while the green man is illuminated. To use the beeper procedure, just use PROCbeeper in the main part of the program just as if it were a built-in procedure.

Numbers can be passed to the new procedures that you write yourself. The beeper mentioned always beeps five times: you could rewrite it so that you can control the number of beeps, like this:

```
1000 DEF PROCbeeper (T)
1010 FOR x = 1 TO T
1020 PROCbeep
1030 PROCpause (0.2)
1040 NEXT
1050 ENDPROC
```

and then use it with PROCbeeper(3) if you only want it to beep three times.

When the main ideas of control programming have been mastered with the traffic light sequence or a buffer box and simple lights, the scope can be extended to control motors on a simple robot such as a turtle or buggy. Usually they can be connected to the interface so that the outputs control the main motors of the buggy, and perhaps a horn or pen arm. Inputs come from collision sensors, or maybe light or heat sensors.

Procedures could be built up to make the buggy go forward for a certain time, turn left and so on: perhaps it could be programmed to turn away from areas where darkness was detected by the light sensor.

Using this simple pair of programs as a basis, it should be possible to build up a complete control system. The use of an interface unit opens up the whole area of computer control – consider for instance all of the electrical devices and fittings in your home which could be run by your micro. Your BBC need not be limited to dealing with numbers and words.

Turn to the yellow pages index on page 113 for details of the Switch listings.

BOX 1. AVAILABLE ROUTINES

PROCon (n)	Switches on output n
PROCoff (n)	Switches off output n
PROCreset	Switches off all outputs
PROCpause (n)	Waits for n seconds
PROCbeep	Beeps
PROCbutton	Waits for space-bar press
FNinputon (n)	True if input n on
FNout (n)	True if output n on
PROCtest	Test inputs

BOX 2. TRAFFIC LIGHTS PROGRAM

```
10 PROCon (A)
20 PROCpause (5)
30 PROCon (B)
40 PROCpause (1)
50 PROCoff (A + B)
60 PROCon (C)
70 PROCpause (5)
80 PROCoff (C)
90 PROCon (B)
100 PROCpause (1)
110 PROCoff (B)
120 PROCon (A)
```

EXTERNAL SWITCHING	RESET	ON	OFF	PAUSE	LIST	RUN	INPUT	FOR	NEXT	TEST
TRAFFIC LIGHTS	RESET	ON	OFF	PAUSE	LIST	RUN		FOR	NEXT	HELP

Keystrip to use with *Switch*

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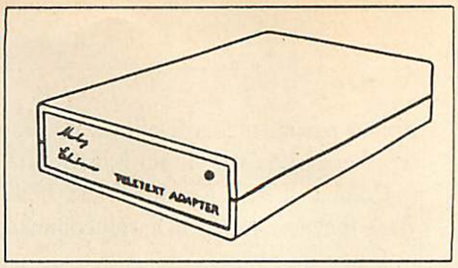
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* No hardware limitations, it can for example receive virtually unlimited numbers of channels.
* Utils disc available including printer drivers allows pages to be selected and dumped direct to a printer



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WHAT THE REVIEWERS SAID:

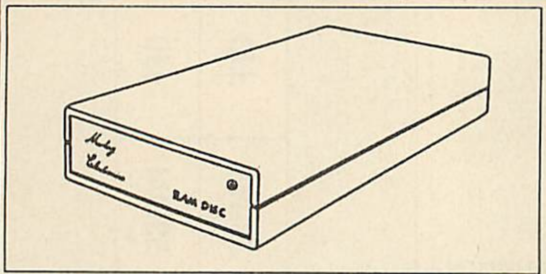
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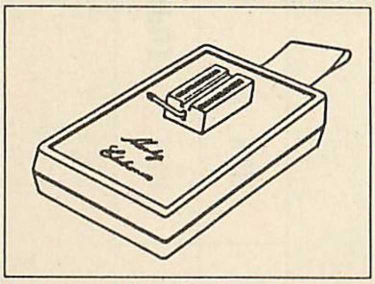
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One megabyte of RAM connected to the 1mHz bus. Used with the supplied ROM software programs and files may be saved and loaded from the RAMdisc in the same manner as from a floppy disc with a large increase of speed, for example, a 20k mode 0 screen takes about 3-4 seconds to load from disc and about 0.2-0.3 seconds to load from the RAMdisc. The RAMdisc ROM operates as a utility ROM working with the current filing system rather than as a separate filing system. Therefore ensures compatibility with any Acorn compatible DFS (not ADFS). The RAMdisc can be selected by a * command to take the place of any drive number from 0 to 9. If the RAMdisc replaces a floppy drive as 0 for example, all commands addressed to drive 0 will be intercepted by the RAMdisc. The default drive number is 4. Any 'Dangerous' *commands such as *COMPACT, *COPY, *BACKUP etc can be intercepted and the BBC's RAM from page 2 to &7FFF saved to RAMdisc workspace, and may be recovered using a *command. This prevents accidental corruption of any programs/data in RAM you may have been using at the time. The filing system wedge ROM supplied supports load/save, byte file access, all relevant OSFSC commands, and contains a formatter verifier and 'sector' editor for use with the RAMdisc. Catalogue structure allows up to 2,688 files.

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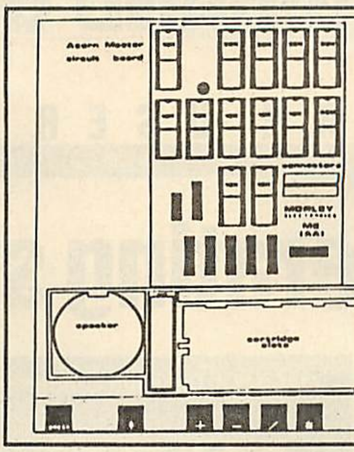
BUILT IN FEATURES (at the press of a button)

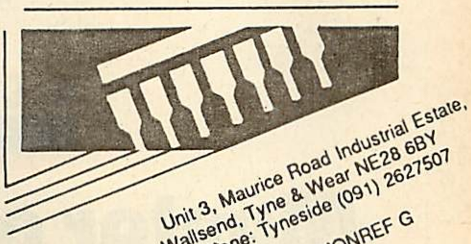
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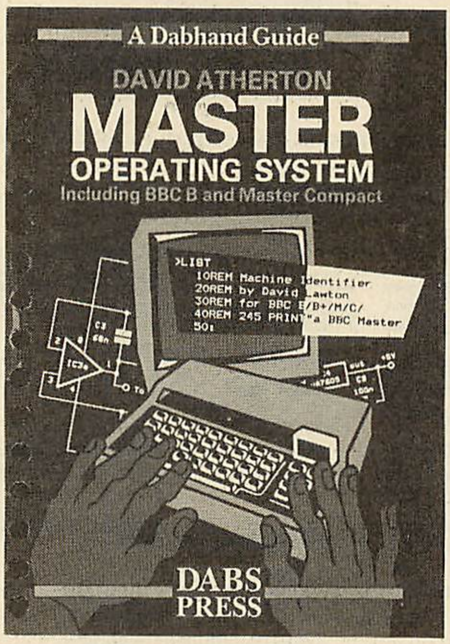
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BETTER BY DESIGN

Learning how to tackle programming difficulties before you even touch the keyboard can save time and improve your programs

Peter Eggleton

Designing a computer program can be quite daunting to a newcomer to programming, as not only do you have to solve the computing problem, but also you have to cope with the instructions or language used by the computer. There has been lots of advice on how to write programs in Basic, but little advice has been proffered on how to attack the computing problem. How do you go about writing a big program?

Most home computer users will at some time decide they need a program to solve a particular problem. It's tempting to do this by sitting down at the keyboard with the manual handy and immediately starting to type, inventing your masterpiece as you go. The trouble is all too often the program doesn't work. You can end up with an over complicated program with bits added to compensate for deficiencies in the initial design. There has to be a better way of designing a solution.

There is a limit to the amount of information that the human mind can deal with at one time. Any programmer attempting to understand a complicated program listing gets confused sorting through a mass of detail. This is much worse if that program listing is spread over several pages. Solving any day-to-day problem is often done by breaking it down into successively smaller portions, until the result is a list of easily managed actions. You can do this with programs too. Program design can be broken down into the following areas; analysis, solution, implementation, testing and documentation.

Analysis is the most critical part of the design process; if it is done correctly then succeeding stages will be that much easier. This is an area where applying the principle of breaking down a problem into smaller units results in efficient design.

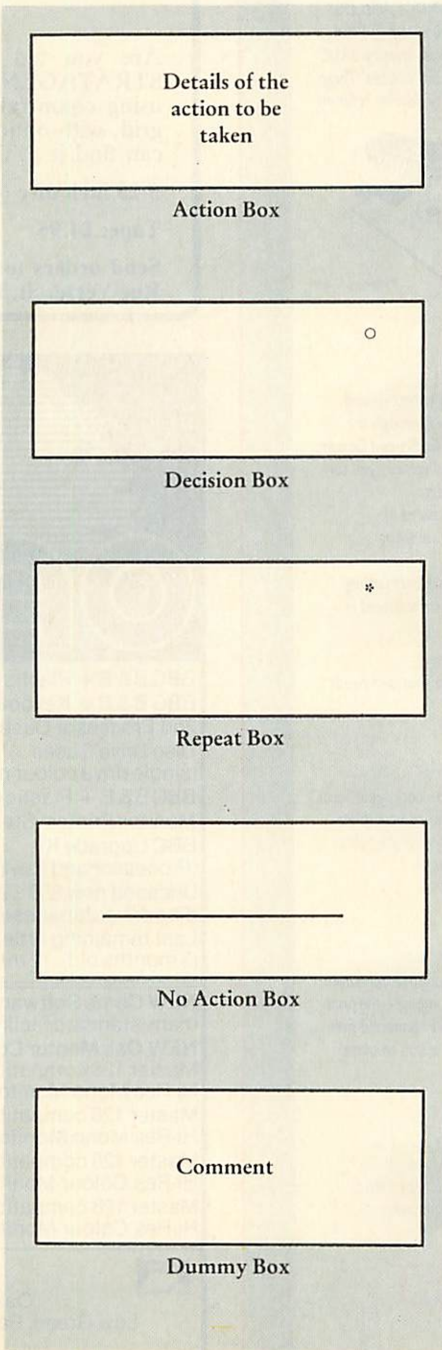


Figure 1. Boxes used in Jackson diagrams

There are a number of methods for doing this. My particular favourite is the use of a technique developed by Michael Jackson which we shall examine later. Use of this system results in both good documentation and a structured design. This means that if the final program is written in BBC Basic, maximum use will be made of the structuring facilities such as REPEAT... UNTIL and procedures. One of the benefits of structured programming is the ease of adding new bits to your program at a later stage, and it also makes your program that much easier to debug.

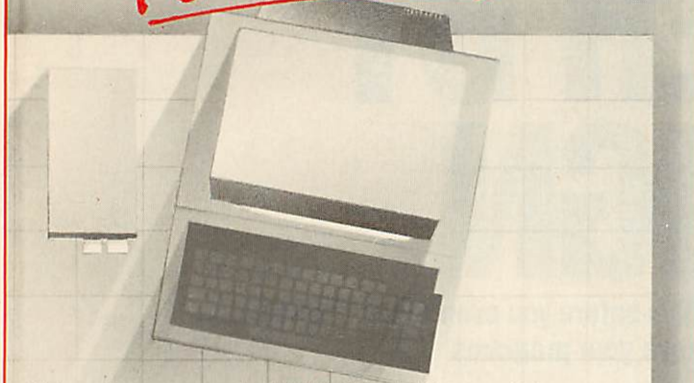
Documentation is as important to the occasional programmer as it is to the professional. Very few people are able to pick up a program they wrote six months ago and remember its structure and peculiarities. So note everything down as the problem is solved. A further benefit arises because other programs can incorporate parts of an established program quite simply if all the details of how to use a particular procedure are written down.

The actions necessary to solve a problem can be broken down into three groups: sequence, looping and decisions.

A program consists of a series of actions carried out one after another, and the sequence of the actions is obviously important. But there are often occasions when a particular action has to be carried out in a number of different places within a program, and so it makes sense only to have one copy of this routine and bring it into action when needed. Small sections of code to be used several times can be written as functions, procedures or subroutines.

Looping is sometimes referred to as iteration, and includes doing a specified

Power Up!



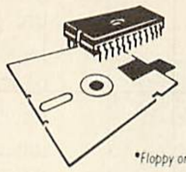
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action for a predetermined number of times using a FOR. . .NEXT loop or REPEAT. . . UNTIL or WHILE.

Decisions refer to those occasions when a selection of options is available, or perhaps when only one is offered. The Basic commands IF, ON and CASE fall into this category. CASE is only available with Basic 5 on the Archimedes.

Solution

The number one rule when designing a program is to stay away from the keyboard until the program has been completely written. As many of the difficulties as possible should be sorted out on paper, before typing anything in.

The result of the analysis stage should be some form of documentation. This could be in the form of a structure diagram, and if so the solution so far is language independent. That is, it doesn't matter at this stage what computer or language will be used to write the program itself. A further benefit is that if your masterpiece is a success and you wish to transfer it to a different machine, you have most of the hard work done already – the design is still applicable.

Now take the design and encode it. Type in a few procedures that do whatever each part of the design calls for. It is a good idea to take each individual procedure and write it separately. Keep them in separate files – so each is in effect a separate program. These can then be given test inputs and the results of the procedure examined to see if they are correct.

Good documentation means the liberal use of comments in the programming. If memory space becomes tight then comments might have to be removed, but it is unwise to do that before it is necessary.

Making up the complete program just means joining together the prewritten functions and procedures, then writing the 'core' of the program to use them in the right order. Remember that with BBC Basic, one program can be added to the end of another using this technique: first find out where in memory the end of the first program is with PRINT ~ TOP−2. This gives an address in hexadecimal – now use that address by typing *LOAD <program> <address>.

As each individual procedure is tested separately first, full system tests should take a shorter time. A professional would compile a list of tests with their expected results, before carrying any of them out.

You should also look for the unexpected – keys pressed when they aren't asked for,

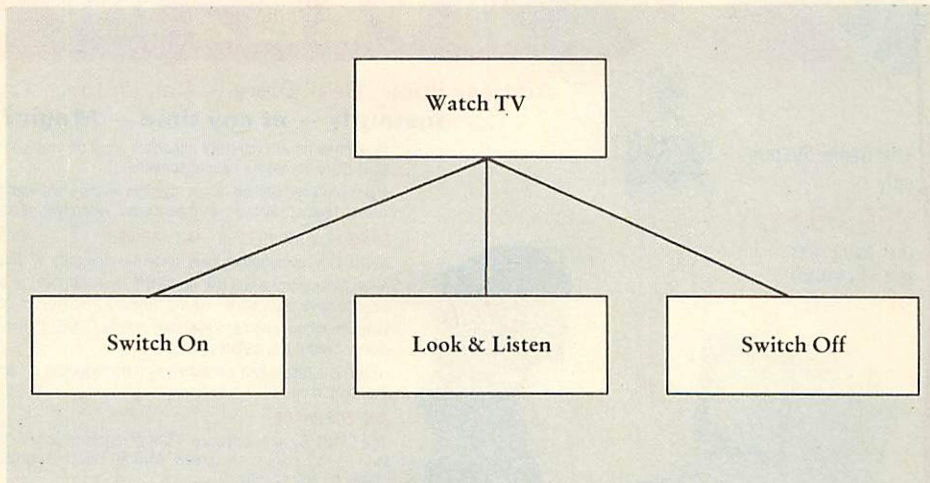


Figure 2. Jackson diagram for watching TV

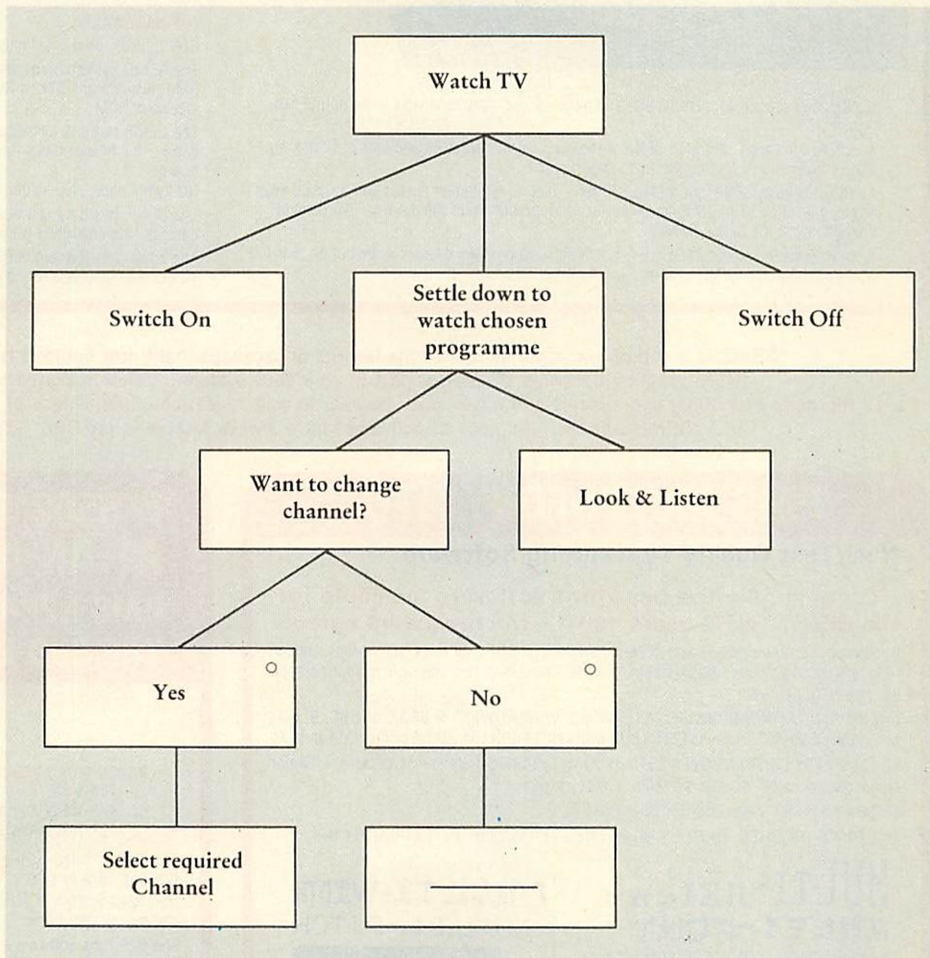


Figure 3. A more elaborate version including channel changing

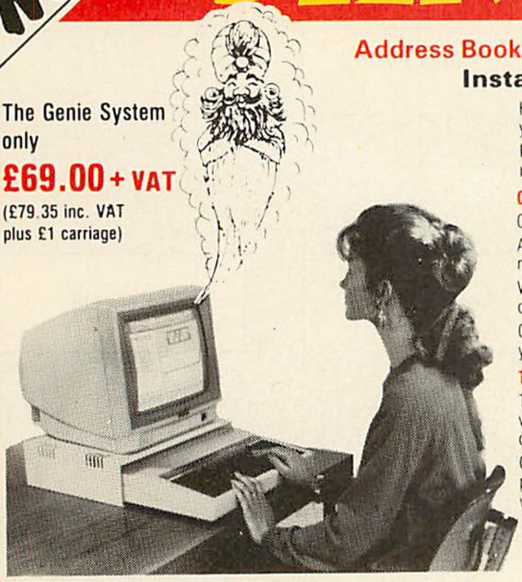
letters typed in instead of numbers, and so on. Any errors detected and subsequently corrected should then be noted in the original design notes.

There are various means of charting the logical flow through a computer program; perhaps the best known is the flowchart. However, this isn't a method that lends itself to assisting with design – it's better suited to documentation. Another commonly used method is pseudo-code. The principle is that the designer writes down in short English statements the steps to be taken. This system does lead to a structured design, but it is not a visual system. One technique that is both visual and aids design is the Jackson method.

This offers the advantage that the design of the program is legible and so is easier to understand. Also the code is easier to write because the design irons out the difficult areas, and the solution documents itself, which therefore makes modification at a later stage a very much easier process.

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GENIE can produce address labels, and pages of the diary notepad can be output to a printer.

In addition to these, stored in GENIE's memory are ASCII tables and lists of commonly used conversion factors eg metric to imperial units.

All the utilities in GENIE are MENU DRIVEN, making full use of cursor and function keys. There is an ON—SCREEN function key strip at the bottom of the display—NO need to change key strips to use GENIE!

If the information stored in GENIE is confidential, a password lock can be put on, barring access to all of the GENIE utilities.

THE HARDWARE

GENIE 'lives' on a small circuit board only 3 inches square.

The GENIE System hardware uses a totally new memory paging technique, developed by PMS, which maps 32K of ROM and 64K of RAM into the address space of a single 16K sideways ROM.

The GENIE board is connected to the computer via a single header on 6 inches of ribbon cable. This header plugs into any ROM socket on the main BBC, MASTER or COMPACT board.

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The basic assumption of Jackson's system is that there are just four types of action within a program: loops, decisions, procedures and assignments. The system uses rectangular boxes to represent each action; unlike flow charts, there is no need for different shaped boxes. The program flows from left to right, top to bottom of the diagram. A '*' in the top right hand corner of a box is used to indicate looping at levels below, whilst an 'O' in the same place is used to show a selection. A selection consists of one of a choice of alternative routes. The box which has just a straight line in it is used with a selection construction. This is necessary to show that nothing happens if the condition required in its associated box is not satisfied, as with the IF. . .*THEN* statement. The types of rectangles used in Jackson diagrams are shown in figure 1. If the few simple rules below are also applied, they make the diagram even easier to follow, but they are not mandatory. The rules are:

- Actions should not be detailed in repeat or decision boxes
- There should only be one path from an action box to the top of the structure
- Only one part of a selection can apply
- The output from a box must be either all selection boxes, just one repeat box or all action boxes
- A further box known as a dummy box, which usually contains just a comment describing the lower levels, is used to satisfy the rules concerning output

Let's look at a few simple exercises to see how the system works. The pastime of watching a TV program could be split down into three action boxes, as shown in figure 2 on page 105.

Looking more closely, each of the three lower boxes involves a number of complex actions. For instance, there's no ability to choose which channel to watch. If the diagram is expanded to include this selection, it might look like figure 3. Notice the use of dummy boxes, which are used to obey the rule: output of the box must be either all selection, all action or one repeat box. This trivial example does demonstrate how a problem is gradually broken down. Now let's use the system to produce a bit of BBC Basic.

The object is to design a guessing game – a simple program that takes a number from the keyboard and compares it to a randomly generated one, giving an indication as to whether the number input is higher or lower than the other. The guessing process is repeated until a match is found. A quick look at this program will show that some iteration (or looping to the rest of us) and decisions will be necessary, so all the different types of boxes will be used in the design. Before looking at figure 4 try to work out the diagram for yourself. Remember to use dummy boxes where necessary to follow the guidelines above.

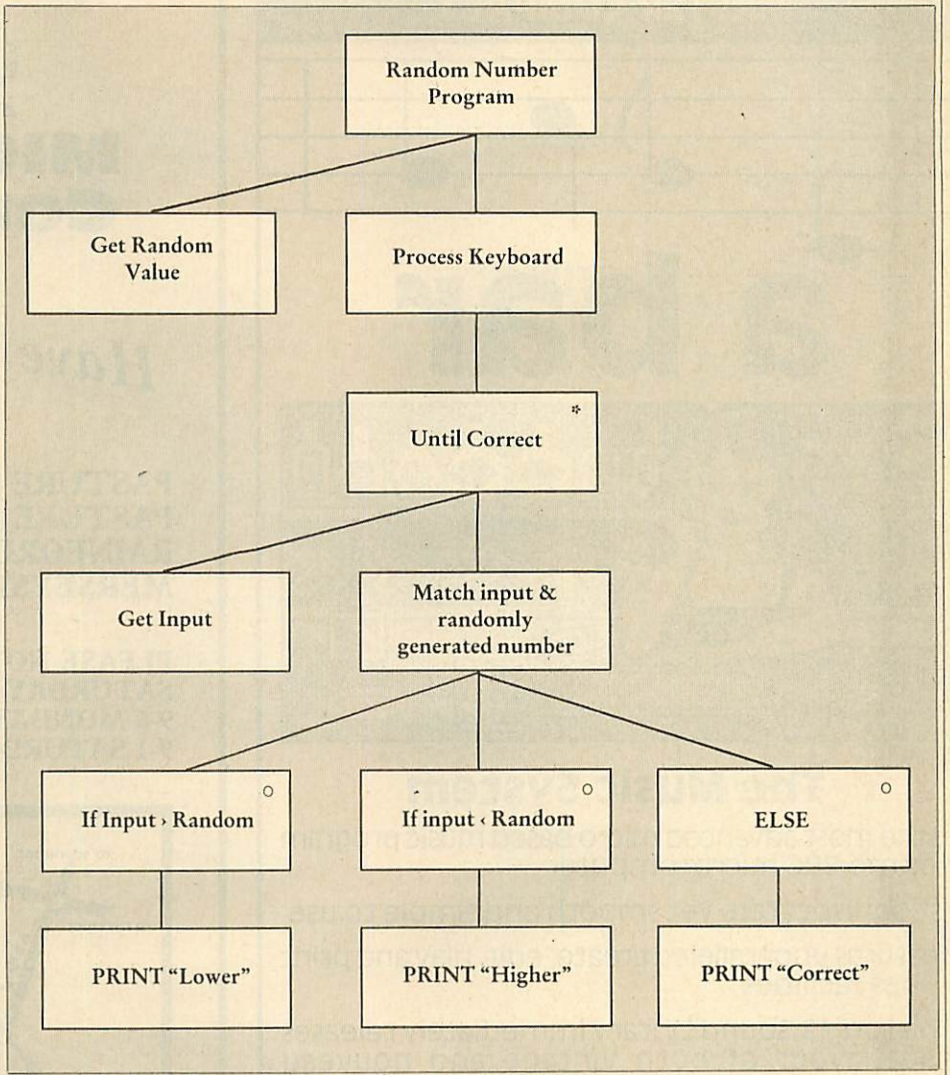


Figure 4. Jackson diagram for the guessing game program

GUESSING GAME PROGRAM

```
    10 REM Guess number
    20 REM
    30 number% = RND(100)
    40 REPEAT
    50 INPUT "Enter your gue
ss ";guess%
    60 IF guess% > number% T
HEN PRINT "Lower  " ELSE IF
 guess% < number% THEN PRIN
T "Higher " ELSE PRINT "Cor
rect "
    70 UNTIL guess% = number
%
    80 END
```

Using the Jackson diagram, each of the boxes can be translated into a suitable Basic statement. The completed program is shown in the box. Notice that the REPEAT loop controls all the statements that correspond to boxes lower down.

Note that although this program has a direct one-to-one relationship with the Jackson diagram, in simple cases this is not always necessary. More than one related action could be entered in the one box. However, it's best to adopt the one statement per box approach from the start.

Alert readers will have noticed that it is impossible to use the GOTO statement when developing programs using Jackson diagrams. But structured programming doesn't just mean not using GOTOs. It means using the structure that the Jackson diagram design gives you, and making your programs as readable as possible, with clear statements, lots of space and comments, and variable names that tell you what each variable does.

The logical design required to produce Jackson diagrams results in a program that is easier to follow, and subsequently should be easier to change. Next time you have a program to write – try it.

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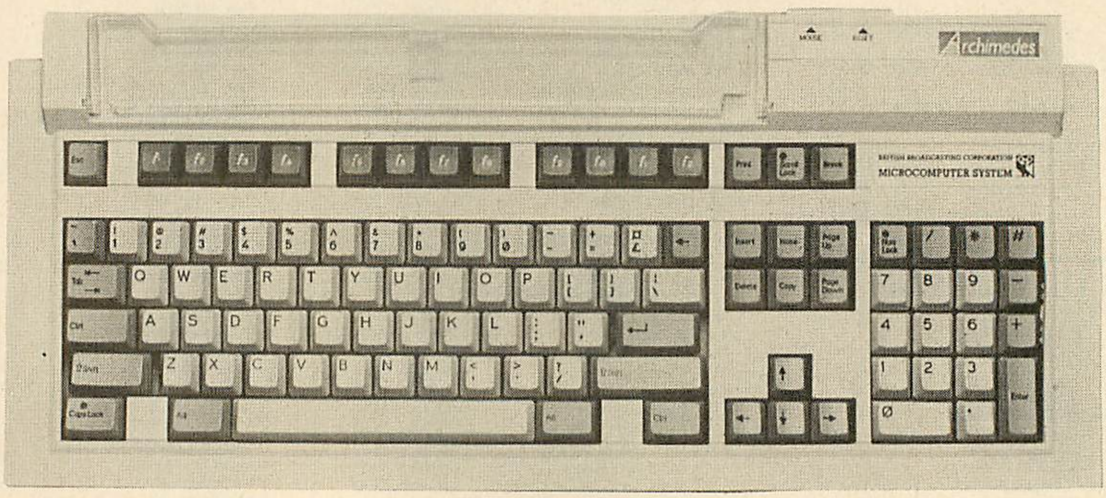
1) In the 17th century many mathematicians constructed mechanical digital calculating machines. Who built the first of these, a machine which could add and subtract, in 1542? And which modern computer language is he linked with?

2) Which German mathematician built, in 1673, the first mechanical digital device which could also multiply, divide and take square roots? The invention was unsuccessful, and only became commercially available after his death.

3) Who designed, but never completed, the first mechanical computing device with all the elements of a modern computer, which had a memory, could do arithmetic and be programmed via a system of punched cards? Also, which modern computer language is his assistant associated with?

4) Who developed a series of punched-card tabulating machines to ease the job of the US Bureau of Census in 1890? What company eventually absorbed the punched-card business? Which computer language widely used in scientific work is his name associated with?

5) In 1959, a servicewoman in the US Navy developed a computer language still widely used in the business and banking world. Who was she, and what is the language?



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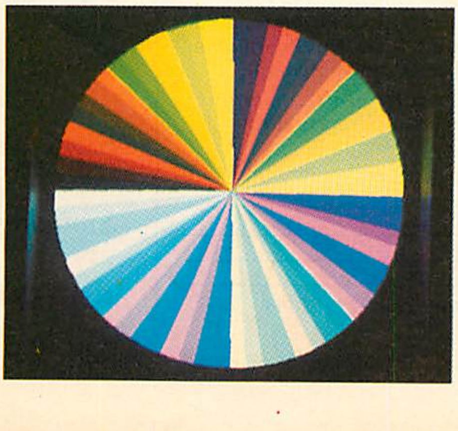
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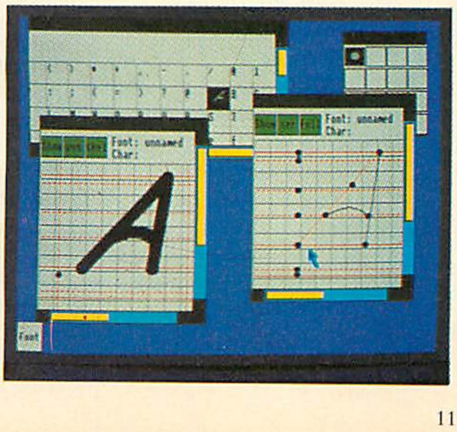
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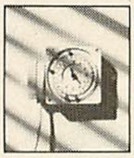






WHY

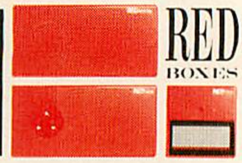
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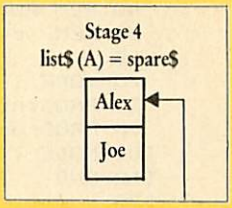
INDEX/COMPATIBILITY

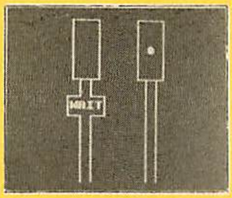
Entering listings

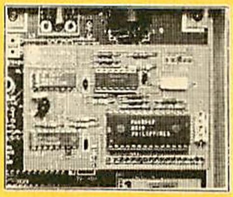
To make the task of entering listings easier, *Acorn User* has adopted several standards in the yellow pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the yellow pages are often listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the yellow pages will help you spot extra or missing characters.

To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1, 2 and 4 (unless stated otherwise) and with operating systems OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering, we provide an easy-to-complete 'How To Enter' box.

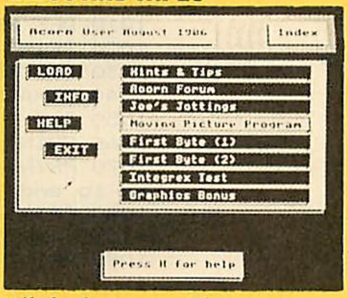
Once you've typed in your program, save it to tape or disc then test it by running it. If you have a major problem with a listing, ask someone to check it. If you still have difficulties, you can also send off for a list of *Checksums* which help you find the errors. Send a large sae (26p stamp) to *AU*Checksums, PO Box 641, London NW9 8TF.







DISCS AND TAPES



All the listings on these pages can be found on this month's listings disc or cassette. See page 130 for details of how to order.

BACK ISSUES





For help with entering and debugging listings see the following back issues: April '86, June '85, Aug '84, Sept '83.

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	114										
Listing 1		■	■	■	■	■	■	■	■	■	■
Listing 2		■	■	■	■	■	■	■	■	■	■
Listing 3			■	■		■	■	■	■	■	
Acorn Forum	116										
Listing 1		■1	■	■	■		■	■	■	■	
Listing 2		■	■	■							■
Listing 3		■	■	■	■	■	■	■	■	■	
Listing 4		■	■			■		■	■	■	■
Listing 5		■	■	■	■	■			■	■	■
Joe's Jottings	119										
Listing 1-6		■	■	■	■	■	■	■	■	■	■
Control											
Listing 1	121	■	■	■		■	■	■	■	■	■
Listing 2		■	■	■	■		■	■	■	■	■
Network Page	124	■	■	■	■		■	■	■	■	■
Top of the List		■	■	■	■	■		■	■	■	■

Notes:
(1) Listing 1 needs sideways RAM

See Hints & Tips, page 43

Listing 1. *View* printer driver generator

```
   10 REM Hints & Tips Listing 1
   20 REM View Printer Driver Generator
   30 REM by Martin Phillips
   40 REM For BBC B/B+/M/C/E
   50 REM (c) Acorn User October 1987
   60 :
   70 MODE 1
   80 PROCinit
   90 PROCrun
  100 MODE 7
  110 END
  120 :
  130 DEF PROCinit
  140 @%=0
  150 DIM cli 30
  160 *KEY 10 OLD|M MODE 7|M |N LIST|M
  170 VDU 19,0,4,0,0,0
  180 VDU 19,2,6,0,0,0
  190 code%=&900
  200 C%=code%+&100
  210 FOR N%=0 TO 13
  220 $(C%+12*N%)=""
  230 NEXT
  240 FOR N%=0 TO 17
  250 tot%=0
  260 FOR I%=0 TO 7
  270 READ a$
  280 a$="&"+a$
  290 val%=EVAL a$
  300 code%?(N%*8+I%)=val%
  310 tot%=tot%+val%
  320 NEXT I%
  330 READ a$
  340 a$="&"+a$
  350 IF EVAL a$<>tot% THEN PRINT "Error
 at DATA line ";N%+1:END
  360 NEXT N%
  370 FOR N%=&8A TO &FF
  380 code%?N%=&FF:NEXT N%
  390 ENDPROC
  400 :
  410 DEF PROCrun
  420 PROCshow
  430 VDU 26,28,0,31,39,19
  440 COLOUR 131
  450 CLS
  460 COLOUR 0
  470 PRINT '"   E..Edit       L..Load
 S..Save"
  480 PRINT "   £..Pound      Q..Quit
P..Print"
  490 VDU 28,0,31,39,23
  500 COLOUR 130
  510 CLS
  520 REPEAT
  530 CLS
  540 COLOUR 0
  550 PRINT '"Enter command: ";
  560 G$=CHR$(GET AND 95)
  570 PRINT G$'
  580 IF G$="E" THEN PROCedit
  590 IF G$="L" THEN PROCload
  600 IF G$="S" THEN PROCsave
  610 IF G$="@" THEN PROCpound
  620 IF G$="Q" THEN PROCquit
  630 IF G$="P" THEN PROCprint
  640 UNTIL G$="Q"
  650 ENDPROC
  660 :
  670 DEF PROCshow
  680 VDU 26,28,0,18,39,0,17,128,12
  690 COLOUR 128
  700 COLOUR 3
```

Continued ►

◄ Hints & Tips listing 1 continued.

```
  710 PRINT "      View Printer Driver Ge
nerator"'
  720 COLOUR 1
  730 PRINT TAB(10) "ON";
  740 COLOUR 2
  750 PRINT TAB(20) "OFF"'
  760 COLOUR 3
  770 FOR N%=0 TO 13
  780 PRINT CHR$(64+N%);"/";CHR$(80+N%);
  790 COLOUR 1
  800 PRINT "  ";
  810 FOR I%=1 TO 3
  820 A%=code%?(&8A+I%+N%*8)
  830 IF A%<255 AND I%=1 THEN PRINT ;A%;
  840 IF A%<255 AND I%>1 THEN PRINT ",";
A%;
  850 NEXT I%
  860 COLOUR 2
  870 PRINT SPC(17-POS);
  880 FOR I%=5 TO 7
  890 A%=code%?(&8A+I%+N%*8)
  900 IF A%<255 AND I%=5 THEN PRINT A%;
  910 IF A%<255 AND I%>5 THEN PRINT ",";
A%;
  920 NEXT I%
  930 COLOUR 3
  940 PRINT SPC(28-POS);
  950 PRINT $(C%+N%*12)
  960 NEXT N%
  970 VDU 26,28,0,31,39,23
  980 COLOUR 130
  990 ENDPROC
 1000 :
 1010 DEF PROCedit
 1020 PRINT "Edit which code? ";
 1030 C$=CHR$(GET AND 79)
 1040 T%=ASC(C$)-64
 1050 CLS
 1060 PRINT "Editing code "C$
 1070 PRINT "Enter a number or press RET
URN to end"
 1080 PRINT "Enter start code: ";:PROCco
de(0)
 1090 PRINT "Enter end code: ";:PROCcode
(4)
 1100 INPUT "Enter comment: "com$
 1110 $(C%+12*T%)=LEFT$(com$,11)
 1120 PROCshow
 1130 ENDPROC
 1140 :
 1150 DEF PROCload
 1160 REPEAT
 1170 INPUT "Enter filename: " name$
 1180 name$=LEFT$(name$,7)
 1190 ch%=OPENUP ("P."+name$)
 1200 CLOSE# ch%
 1210 IF ch%=0 THEN VDU 7:PRINT "No such
 driver"
 1220 UNTIL ch%<>0
 1230 PROCoscli("LOAD P."+name$+" 900")
 1240 PROCshow
 1250 ENDPROC
 1260 :
 1270 DEF PROCsave
 1280 INPUT "Enter filename: "name$
 1290 name$=LEFT$(name$,7)
 1300 PROCoscli("SAVE "+name$+" 900 +FF
400")
 1310 PROCoscli("SAVE P."+name$+" 900 +1
FF")
 1320 ENDPROC
 1330 :
```

Continued ►

◀Hints & Tips listing 1 continued

```
1340 DEF PROCpound
1350 INPUT "Enter ASCII code for £: " p%
1360 code%?&4C=p%
1370 ENDPROC
1380 :
1390 DEF PROCquit
1400 PRINT "Are you sure? ";
1410 g$=CHR$(GET AND 95)
1420 IF g$<>"Y" THEN G$=""
1430 ENDPROC
1440 :
1450 DEF PROCprint
1460 VDU 2
1470 PROCshow
1480 VDU 3
1490 ENDPROC
1500 :
1510 DEF PROCoscli($cli)
1520 X%=cli MOD 256
1530 Y%=cli DIV 256
1540 CALL &FFF7
1550 ENDPROC
1560 :
1570 DEF PROCcode(c)
1580 code%!(&8A+T%*8+c)=&FFFFFFFF
1590 INPUT LINE n$
1600 I%=c
1610 REPEAT
1620 I%=I%+1
1630 code%?(&8A+T%*8+I%)=VAL(n$)
1640 x=INSTR(n$,",")
1650 n$=MID$(n$,x+1)
1660 UNTIL x=0
1670 code%?(&8A+T%*8+c)=I%-c
1680 IF (I%=c+1) AND (n$="") THEN code%!(&8A+T%*8+c)=&FFFFFFFF
1690 ENDPROC
1700 :
1710 DATA 4C,1F,04,4C,13,04,4C,19,137
1720 DATA 04,4C,56,04,4C,56,04,00,150
1730 DATA 00,00,00,A9,02,20,EE,FF,2B8
1740 DATA 60,A9,03,20,EE,FF,60,8D,406
1750 DATA 10,04,8E,11,04,8C,12,04,159
1760 DATA AD,0F,04,F0,09,EE,0F,04,2BA
1770 DATA AD,10,04,4C,57,04,AD,10,225
1780 DATA 04,C9,8D,D0,06,CE,0F,04,311
1790 DATA 4C,50,04,C9,00,30,10,C9,272
1800 DATA 60,D0,02,A9,23,20,E3,FF,400
1810 DATA AE,11,04,AC,12,04,60,29,20E
1820 DATA 0F,0A,0A,0A,AA,BD,8A,04,222
1830 DATA C9,FF,F0,EC,49,80,9D,8A,594
1840 DATA 04,29,80,D0,04,E8,E8,E8,439
1850 DATA E8,BD,8A,04,29,03,A8,E8,3EF
1860 DATA A9,01,20,EE,FF,BD,8A,04,402
1870 DATA 20,EE,FF,E8,88,D0,F1,4C,58A
1880 DATA 50,04,FF,FF,FF,FF,FF,FF,64E
```

Listing 2. Spooled file replayer

```
10 REM Hints & Tips Listing 2
20 REM spool file replayer
30 REM J Chisholm and G Bell
40 REM for BBC B/B+/E
50 REM (C) Acorn User October 1987
60 :
70 block=&A8
80 escflag=&FF
90 osasci=&FFE3
100 osargs=&FFDA
110 osbget=&FFD7
120 osfind=&FFCE
130 :
```

Continued ▶

◀ Hints & Tips listing 2 continued

```
140 FOR pass=0 TO 3 STEP 3
150 P%=&900
160 [
170 OPT pass
180 LDA #1
190 LDX #block
200 LDY #0
210 JSR osargs
220 :
230 LDY #&FF
240 .spaces
250 INY
260 LDA (block),Y
270 CMP #32
280 BEQ spaces
290 BCC noarg
300 :
310 LDX #0
320 .notspaces
330 STA buffer,X
340 INX
350 INY
360 LDA (block),Y
370 CMP #31
380 BCS notspaces
390 LDA #13
400 STA buffer,X
410 :
420 LDA #&40
430 LDX #buffer MOD 256
440 LDY #buffer DIV 256
450 JSR osfind
460 TAY
470 BEQ notopen
480 :
490 LDA #0
500 PHA
510 .loop
520 JSR osasci
530 JSR osbget
540 BIT escflag
550 BMI close
560 BCC loop
570 :
580 .close
590 PLA
600 JSR osfind
610 RTS
620 :
630 .notopen
640 BRK
650 OPT FNequs (CHR$128+"Not found")
660 .noarg
670 BRK
680 OPT FNequs (CHR$129+"No filename")
690 BRK
700 .buffer
710 ]
720 NEXT
730 :
740 S%=0
750 FOR I%=&900 TO &95E
760 S%=S%+?I%
770 NEXT
780 IF S%<>&2E13 THEN PRINT "Assembler error - please check listing":END
790 *SAVE PRINT 900 +5F
800 END
810 :
820 DEF FNequs (string$)
830 $P%=string$
840 P%=P%+LEN string$
850 =pass
```

Listing 4. Testing the printer

```
 10 REM Hints & Tips listing 4
 20 REM Printer tester
 30 REM by Juliet Wilson
 40 REM for B/B+/M/C/E/A
 50 REM (C) Acorn User October 1987
 60 :
 70 PROCprinteron
 80 FOR I% = 1 TO 10
 90 PRINT "Hello"
100 NEXT
110 PROCprinteroff
120 END
130 :
140 DEF PROCprinteron
150 LOCAL space%, time%
160 space%=ADVAL-4
170 VDU 2,1,0,1,0,1,0,1,0
180 time%=TIME
190 REPEAT UNTIL TIME>time%+100
200 IF space%<>ADVAL-4 THEN VDU 3:*FX
21,3
210 ENDPROC
220 :
230 DEF PROCprinteroff:VDU 3:ENDPROC
```

See Acorn Forum, page 53

Listing 1. Initialising ROM images

```
   10 REM Initialising R
OM images
   20 REM by Quentin Sta
fford-Fraser
   30 REM for BBC B+128K
/M and B with SRAM
   40 REM (C) Acorn User
 October 1987
   50 :
   60 MODE 7
   70 org=&C80
   80 DIM space 100
   90 FOR opt=4 TO 7 STE
P 3
  100 P%=org
  110 O%=space
  120 [OPT opt
  130 .start
  140 LDA #170
  150 LDX #0
  160 LDY #&FF
  170 JSR &FFF4
  180 STX &72
  190 STY &73
  200 LDA #15
  210 STA &70
  220 .loop
  230 LDA #&07
  240 JSR read
  250 CLC
  260 ADC #2
  270 JSR read
  280 CMP #ASC"C"
  290 BNE empty
  300 LDA #&06
  310 JSR read
  320 LDY &70
  330 STA (&72),Y
  340 .empty
  350 DEC &70
  360 BPL loop
  370 LDA #143
  380 LDX #&27
  390 JSR &FFF4
  400 RTS
  410 .read
  420 STA &F6
  430 LDA #&80
  440 STA &F7
  450 LDY &70
  460 JMP &FFB9
  470 ]NEXT
  480 PRINT "Press SPACE
 to save code"
```

Continued ▶

◀ Acorn Forum listing 1 continued

```
  490 REPEAT UNTIL GET=3
2
  500 PROCoscli("*SAVE R
omInit "+STR$~space+" "+
STR$~O%+" "+STR$~start+"
 "+STR$~start)
  510 END
  520 :
  530 DEF PROCoscli($&70
0)
  540 PRINT $&700
  550 LOCAL X%,Y%
  560 Y%=7
  570 CALL &FFF7
  580 ENDPROC
```

Listing 2 *Fleet St.* graphics converter

```
   10 REM Fleet St Graph
ics Convertor
   20 REM by Jonathan Te
mple
   30 REM for B/B+/M wit
h FSE
   40 REM (C) Acorn User
 October 1987
   50 :
   60 MODE 4
   70 INPUT "FSE picture
 name : " F$
   80 $&700="L. "+F$+" 3
000"
   90 X%=0
  100 Y%=7
  110 CALL &FFF7
  120 !&5000=0
  130 N%=&5800
  140 FOR M%=&3604 TO &4
F04 STEP 256
  150 FOR K%=0 TO 252 ST
EP 4
  160 N%!K%=M%!K%
  170 NEXT
  180 N%=N%+320
  190 NEXT
```

Listing 3. Code key emulator

```
   10 REM Code Key Emula
tor
   20 REM by Ian Goldby
   30 REM for B/E/B+/M
```

Continued ▶

◀ Acorn Forum listing 3 continued

```
   40 REM (C) Acorn User
 October 1987
   50 REM Press TAB to t
oggle
   60 :
   70 code%=&A00
   80 osbyte=&FFF4
   90 osrdch=&FFE0
  100 rdvec=&210
  110 :
  120 FOR pass%=0 TO 3 S
TEP 3
  130 P%=code%
  140 [OPT pass%
  150 .init
  160 LDA rdvec
  170 STA start+1
  180 LDA rdvec+1
  190 STA start+2
  200 LDA #start MOD 256
  210 STA rdvec
  220 LDA #start DIV 256
  230 STA rdvec+1
  240 LDA #0
  250 STA char+1
  260 LDA #&DB
  270 LDX #0
  280 LDY #0
  290 JMP osbyte
  300 :
  310 .start
  320 JSR &FFFF
  330 BCS out
  340 PHP
  350 STA char
  360 TXA
  370 PHA
  380 TYA
  390 PHA
  400 LDA #&81
  410 LDX #&9F
  420 LDY #&FF
  430 JSR osbyte
  440 CPX #&FF
  450 BEQ toggle
  460 :
  470 .convert
  480 LDA char
  490 EOR char+1
  500 STA char
  510 :
  520 .restore
  530 PLA
  540 TAY
```

Continued ▶

◄ Acorn Forum listing 3 continued

```
550 PLA
560 TAX
570 LDA char
580 PLP
590 .out
600 RTS
610 .toggle
620 LDA #&80
630 EOR char+1
640 STA char+1
650 TAX
660 LDA #&89
670 JSR osbyte
680 PLA
690 TAY
700 PLA
710 TAX
720 LDA char
730 PLP
740 JMP start
750 .char
760 BRK
770 ]
780 NEXT pass%
790 :
800 S%=0
810 FOR I%=init TO cha
r
820 S%=S%+?I%
830 NEXT
840 IF S%<>11387 PRINT
 "Assembler error - plea
se check listing":END
850 :
860 *SAVE TABCODE A00
+69
```

Listing 4. Basic @<addr> emulator

```
10 REM BASIC @<addr>
emulator
20 REM by David Spenc
er
30 REM for B/B+/E
40 REM (C) Acorn User
 October 1987
50 :
60 addr=&60
70 nlf=&62
80 temp=&63
90 oldv=&64
100 blk=&66
110 DIM cli% &30
120 :
130 wordv=&20C
140 osargs=&FFDA
150 osasci=&FFE3
160 osbyte=&FFF4
170 :
180 FOR pass=0 TO 3 ST
EP 3
190 P%=&900
200 [OPT pass
210 JMP chk
220 :
230 .setaddr
240 LDA 0
250 STA addr
260 LDA 1
270 STA addr+1
280 LDA wordv
290 STA oldv
```

Continued ►

◄ Acorn Forum listing 4 continued

```
300 LDA wordv+1
310 STA oldv+1
320 LDA #start MOD &10
0
330 STA wordv
340 LDA #start DIV &10
0
350 STA wordv+1
360 .sbasic
370 LDA #&BB
380 LDX #0
390 LDY #&FF
400 JSR osbyte
410 LDA #&8E
420 JMP osbyte
430 :
440 .start
450 CMP #0
460 BEQ us
470 JMP (oldv)
480 .us
490 STY blk+1
500 STX blk
510 LDY #0
520 LDA (blk),Y
530 STA blk+2
540 INY
550 LDA (blk),Y
560 STA blk+3
570 .newline
580 LDY #0
590 .eloop
600 LDA (addr),Y
610 CMP #13
620 BEQ crfnd
630 INY
640 CPY #&E0
650 BNE eloop
660 LDA oldv
670 STA wordv
680 LDA oldv+1
690 STA wordv+1
700 LDA #6
710 JSR osasci
720 LDA #13
730 LDY #0
740 STA (blk+2),Y
750 LDY #0
760 CLC
770 RTS
780 :
790 .crfnd
800 STY temp
810 LDY #&FF
820 .sloop
830 INY
840 LDA (addr),Y
850 CMP #ASC" "
860 BEQ sloop
870 .dloop
880 LDA (addr),Y
890 CMP #ASC"0"
900 BCC notd
910 CMP #ASC"9"+1
920 BCS notd
930 INY
940 BNE dloop
950 .notd
960 TYA
970 BEQ nline
980 LDY #0
990 .ploop
1000 LDA (addr),Y
1010 STA (blk+2),Y
```

Continued ►

◄ Acorn Forum listing 4 continued

```
1020 CMP #13
1030 BEQ endol
1040 INY
1050 BNE ploop
1060 :
1070 .endol
1080 TYA
1090 SEC
1100 ADC addr
1110 STA addr
1120 BCC out
1130 INC addr+1
1140 CLC
1150 .out
1160 DEY
1170 RTS
1180 :
1190 .nline
1200 LDA temp
1210 SEC
1220 ADC addr
1230 STA addr
1240 LDA addr+1
1250 ADC #0
1260 STA addr+1
1270 CLC
1280 BCC newline
1290 :
1300 .tcall
1310 LDX #blk MOD &100
1320 LDY #blk DIV &100
1330 JMP &406
1340 :
1350 .bmess
1360 OPT FNequs("BASIC"
)
1370 OPT FNequb(13)
1380 OPT FNequb(13)
1390 OPT FNequb(21)
1400 :
1410 .chk
1420 LDX #blk
1430 LDY #0
1440 LDA #1
1450 JSR osargs
1460 LDX #20
1470 .cloop
1480 LDA (blk),Y
1490 CMP #13
1500 BEQ sbasic2
1510 CMP #ASC"@"
1520 BEQ atfnd
1530 INY
1540 DEX
1550 BNE cloop
1560 .sbasic2
1570 JMP sbasic
1580 :
1590 .atfnd
1600 INY
1610 LDA (blk),Y
1620 CMP #13
1630 BEQ atfnd7
1640 DEY
1650 LDA #0
1660 STA blk+2
1670 STA blk+3
1680 .atfnd2
1690 INY
1700 LDA (blk),Y
1710 CMP #13
1720 BEQ atfnd5
```

Continued ►

◀ Acorn Forum listing 4 continued

```
1730 CMP #ASC"0"
1740 BCC sbasic2
1750 CMP #ASC"9"+1
1760 BCC atfnd3
1770 AND #&DF
1780 CMP #ASC"A"
1790 BCC sbasic2
1800 CMP #ASC"F"+1
1810 BCS sbasic2
1820 SBC #6
1830 .atfnd3
1840 AND #&F
1850 PHA
1860 LDX #4
1870 .atfnd4
1880 ASL blk+2
1890 ROL blk+3
1900 BCS sbasic2
1910 DEX
1920 BNE atfnd4
1930 PLA
1940 ORA blk+2
1950 STA blk+2
1960 JMP atfnd2
1970 .atfnd5
1980 JSR tchk
1990 TXA
2000 BNE atfnd6
2010 LDA blk+2
2020 STA 0
2030 LDA blk+3
2040 STA 1
2050 JMP atfnd7
2060 .atfnd6
2070 LDA #3
2080 LDX #tb MOD &100
2090 LDY #tb DIV &100
2100 JSR &406
2110 LDA blk+2
2120 STA &FEE5
2130 LDA blk+3
2140 STA &FEE5
2150 .atfnd7
2160 LDY #0
2170 .ploop
2180 LDA bmess,Y
2190 JSR osasci
2200 INY
2210 CPY #8
2220 BNE ploop
2230 JSR tchk
2240 TXA
2250 BNE tcopy
2260 JMP setaddr
2270 :
2280 .tcopy
2290 LDA #0
2300 STA blk
2310 STA blk+2
2320 STA blk+3
2330 LDA #6
2340 STA blk+1
2350 LDA #7
2360 JSR tcall
2370 LDY #0
2380 .wloop
2390 LDA &900,Y
2400 CPY #&1B
2410 BNE wait
2420 LDA #6
2430 .wait
2440 BIT &FEE4
2450 BVC wait
```

Continued ▶

◀ Acorn Forum listing 4 continued

```
2460 STA &FEE5
2470 INY
2480 BNE wloop
2490 LDA #setaddr MOD &
100
2500 STA blk
2510 LDA #6
2520 STA blk+1
2530 LDA #4
2540 JMP tcall
2550 :
2560 .tchk
2570 LDA #&EA
2580 LDX #0
2590 LDY #&FF
2600 JMP osbyte
2610 :
2620 .tb
2630 BRK:BRK:BRK:BRK
2640 :
2650 ]NEXT
2660 :
2670 IF NOT FNchecksum
THEN PRINT "Assembler er
ror - please check listi
ng":END
2680 PROCoscli("SAVE BA
SIC 900 A93 FFFF0900 FFF
F0900")
2690 END
2700 :
2710 DEF FNequb(byte%)
2720 ?P%=byte%
2730 P%=P%+1
2740 =pass
2750 :
2760 DEF FNequs(text$)
2770 $P%=text$
2780 P%=P%+LEN text$
2790 =pass
2800 :
2810 DEF FNchecksum
2820 S%=0
2830 FOR I%=&900 TO &A9
2
2840 S%=S%+?I%
2850 NEXT
2860 =(S%=&B80A)
2870 :
2880 DEF PROCoscli($cli
%)
2890 X%=cli%
2900 Y%=cli% DIV 256
2910 CALL &FFF7
2920 ENDPROC
```

Listing 5. Auto-Off screen saver

```
10 REM AutoOff screen
saver
20 REM by David Acton
30 REM for BBC B/B+/M
/C
40 REM (C) Acorn User
October 1987
50 :
60 PROCvar
70 PROCass
80 IF FNchecksum THEN
*SAVE AUTOOFF FFFF0A00
+100
```

Continued ▶

◀ Acorn Forum listing 5 continued

```
90 END
100 :
110 DEF PROCvar
120 code%=&A00
130 FOR I%=code% TO co
de%+&FF
140 ?I%=0
150 NEXT
160 osbyte=&FFF4
170 osword=&FFF1
180 oldeventv=?&220+25
6*?&221
190 oldreadv=?&210+256
*?&211
200 ENDPROC
210 :
220 DEF PROCass
230 FOR pass%=0 TO 3 S
TEP 3
240 P%=code%
250 [
260 OPT pass%
270 .init
280 LDA #0
290 STA ofonflag
300 LDA #neweventv MOD
256
310 STA &220
320 LDA #neweventv DIV
256
330 STA &221
340 LDA #newreadv MOD2
56
350 STA &210
360 LDA #newreadv DIV2
56
370 STA &211
380 LDA #14
390 LDX #5
400 JSR osbyte
410 .timeset
420 LDX #min5 MOD256
430 LDY #min5 DIV256
440 LDA #4
450 JMP osword
460 :
470 .neweventv
480 PHA
490 STA store
500 TXA
510 PHA
520 TYA
530 PHA
540 LDA store
550 CMP #5
560 BNE nottimeup
570 LDA #1
580 STA ofonflag
590 LDA #48
600 JSR setreg
610 LDA #48
620 JSR sound
630 LDA #96
640 JSR sound
650 LDA #144
660 JSR sound
670 LDA #192
680 JSR sound
690 .nottimeup
700 PLA
710 TAY
720 PLA
730 TAX
```

Continued ▶

JOE'S JOTTINGS

◀ **Acorn Forum listing 5 continued**

```
740 LDA store
750 PLP
760 JMP oldeventv
770 :
780 .newreadv
790 PHP
800 PHA
810 TXA
820 PHA
830 TYA
840 PHA
850 LDA ofonflag
860 BEQ notoff
870 LDA #0
880 STA ofonflag
890 JSR setreg
900 .notoff
910 JSR timeset
920 PLA
930 TAY
940 PLA
950 TAX
960 PLA
970 PLP
980 JMP oldreadv
990 :
1000 .setreg
1010 STA setor+1
1020 LDA #8
1030 STA &FE00
1040 LDA #160
1050 LDX #&55
1060 JSR osbyte
1070 LDA #1
1080 CPX #7
1090 BNE setor
1100 LDA #147
1110 .setor
1120 ORA #0
1130 STA &FE01
1140 RTS
1150 .sound
1160 STA beep+4
1170 LDA #7
1180 LDX #beep MOD256
1190 LDY #beep DIV256
1200 JMP osword
1210 .ofonflag BRK
1220 .store BRK
1230 .min5 BRK:BRK:BRK:
BRK:BRK
1240 .beep
1250 ]
1260 NEXT
1270 ?min5=&D0:min5!1=&
FFFFFF8A
1280 ?beep=1:beep?2=&FA
:beep?3=&FF
1290 beep?6=1
1300 ENDPROC
1310 :
1320 DEF FNchecksum
1330 J%=0
1340 FOR I%=code% TO co
de%+&FF
1350 J%=J%+?I%
1360 NEXT
1370 IF J%=&4CFF THEN =
TRUE
1380 PRINT "Assembler e
rror - please check list
ing"
1390 END
```

See Joe's Jottings, page 81

Listing 1. File creator

```
10 REM File Creator
20 REM By Joe Telford
30 REM For BBC B/B+/M/C/E/A
40 REM (C) Acorn User October 1987
50 :
60 CLOSE# 0
70 ch%=OPENOUT("Clubdat")
80 RESTORE
90 reclen%=277
100 recno%=0
110 READ fields%
120 REPEAT
130 recno%=recno%+1
140 PTR# ch%=recno%*reclen%
150 READ item$
160 IF item$<>"**END**" THEN PROCtxfie
lds
170 UNTIL item$="**END**"
180 PRINT item$
190 PTR# ch%=0
200 PRINT# ch%,recno%-1,fields%,reclen
%
210 CLOSE# ch%
220 END
230 :
240 DEF PROCtxfields
250 PRINT# ch%,item$:PRINTitem$
260 FOR field%=2 TO fields%
270 READ item$
280 PRINT# ch%,item$
290 PRINT item$
300 NEXT
310 PRINT '
320 ENDPROC
330 :
340 DATA 11
350 DATA Smith,John,Mr,131 Wakefield P
ark,Summerton,Cheshire,TX13 4BZ,092 3452
23,Pd,Canon T90,B&W
360 DATA Johnson,Sue,Mrs,63 Ravenswort
h Ave,Witford,Wotshire,WA11 3ED,0320 223
8900,Due,Konica FS1,Print
```

Continued ▶

◀ **Joe's Jottings listing 1 continued**

```
370 DATA Jones,James,Mr,The Tall Tress
,Westmanster,Yorks,BP2 3TT,0652 2316678,
Pd,Nikon F301,Slide
380 DATA Singh,Ravi,Mr,1 Upminster Roa
d,Buiton,Berks,BU56 2BF,0229 239846,Due,
Leica M3,B&W
390 DATA Pert,Pamela,Mrs,23 The Avenue
,St. Alberts,Lincs,ST1 1TT,0234 983733,P
d,Pentax ME,Print
400 DATA Coothers,Sally,Miss,Glass Lan
e,Southorp,Cumberland,QW3 8FT,0653 54587
1,Due,Minolta 7000,Slide
410 DATA Hopen,Iris,Ms,The Gallery,Low
er Stoppinton,Dorset,PW23 4TY,0818 54525
7,Pd,Canon FTb,B&W
420 DATA Jottings,Joe,Mr,Telford Tower
s,Eaglesridge,Cleverland,RS15 8HD,0425 1
43792,Due,Box Brownie,Slide
430 DATA Quinn,Antonius,Sir,Strungfell
ows,Liverton,Bathshire,LL2 2LL,0236 5428
84,Pd,Canon EOS,Print
440 DATA Alex,Mad,Mr,The Dungeon,Redwo
od Place,London,WC2B 5TF,01 836 2441,Due
,Zenit B,B&W
450 DATA **END**
```

Listing 2. File loader

```
10 REM File loader
20 REM by Joe Telford
30 REM for BBC B/B+/M/C/E/A
40 REM (C) Acorn User Oct 1987
50 :
60 CLOSE# 0
70 PROCreadfile("Clubdat")
80 PROCaddressdata
90 END
100 :
110 DEF PROCreadfile(name$)
120 ch%=OPENIN(name$)
130 INPUT# ch%,recno%,fields%,reclen%
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
 140 items%=recno%*fields%
 150 DIM file$(recno%,fields%)
 160 FOR record%=1 TO recno%
 170 PRINT ;recno%-record%;" records to
read "
 180 VDU 11
 190 PTR# ch%=record%*reclen%
 200 FOR field%=1 TO fields%
 210 INPUT# ch%,file$(record%,field%)
 220 NEXT
 230 NEXT
 240 CLOSE# ch%
 250 PRINT ' "All read"
 260 ENDPROC
 270 :
 280 DEF PROCaddressdata
 290 FOR record%=1 TO recno%
 300 PRINT file$(record%,3);" ";file$(r
ecord%,2);" ";file$(record%,1)
 310 FOR field%=4 TO 7
 320 PRINT file$(record%,field%)
 330 NEXT
 340 RESTORE
 350 FOR field%=8 TO 11
 360 READ name$
 370 PRINT name$;": ";file$(record%,fie
ld%)
 380 NEXT
 390 PRINT
 400 NEXT
 410 ENDPROC
 420 :
 430 DATA Phone,Subs,Camera type,Entry
 440 :
 450 DEF PROCtime
 460 PRINT ;TIME/100;" seconds to sort
";recno%;" records of ";fields%;" fields
."
 470 PRINT "Press SPACE to continue"
 480 REPEAT UNTIL GET=32
 490 ENDPROC
 500 :
 510 DEF PROCswap(rec1%,rec2%)
 520 PRINT rec1%;" - ";rec2%
 530 FOR field%=1 TO fields%
 540 spare$(field%)=file$(rec1%,field%)
 550 file$(rec1%,field%)=file$(rec2%,fi
eld%)
 560 file$(rec2%,field%)=spare$(field%)
 570 NEXT
 580 ENDPROC
```

Listing 3. Exchange sort

```
  10 REM File sort 1 - Exchange sort
  20 REM By Joe Telford
  30 REM For BBC B/B+/M/C/E/A
  40 REM (C) Acorn User October 1987
  50 :
  60 CLOSE #0
  70 PROCreadfile("Clubdat")
  80 DIM spare$(fields%)
  90 PROCexchange(1)
 100 PROCaddressdata
 110 END
 120 :
 130 DEF PROCexchange(f%)
 140 PRINT"Exchange sorting on field ";
f%:TIME=0
 150 LOCAL loop1%,loop2%
 160 FOR loop1%=1 TO recno%-1
```

Continued ▶

◀ **Joe's Jottings listing 3 continued**

```
 170 ptr%=loop1%
 180 FOR loop2%=loop1%+1 TO recno%
 190 IF file$(loop2%,f%)<file$(ptr%,f%)
THEN ptr%=loop2%
 200 NEXT
 210 IF ptr%<>loop1% THEN PROCswap(ptr%
,loop1%)
 220 NEXT
 230 PROCtime
 240 ENDPROC
```

Listing 4. Bubble sort

```
  10 REM File sort 2 - Bubble sort
  20 REM By Joe Telford
  30 REM For BBC B/B+/M/C/E/A
  40 REM (C) Acorn User October 1987
  50 :
  60 CLOSE# 0
  70 PROCreadfile("Clubdat")
  80 DIM spare$(fields%)
  90 PROCbubble(1)
 100 PROCaddressdata
 110 END
 120 :
 130 DEF PROCbubble(f%)
 140 PRINT "Bubble Sorting on field ";f
%:TIME=0
 150 LOCAL loop1%,loop2%,last%
 160 last%=recno%-1
 170 FOR loop1%=1 TO recno%
 180 flag%=0
 190 FOR loop2%=0 TO last%
 200 IF file$(loop2%,f%)>file$(loop2%+1
,f%) THEN PROCswap(loop2%,loop2%+1):flag
%=1
 210 NEXT loop2%
 220 last%=last%-1
 230 IF flag%=0 THEN loop1%=recno%
 240 NEXT loop1%
 250 PROCtime
 260 ENDPROC
```

Listing 5. Shell-Metzner sort

```
  10 REM File sort 3 - Shell Metzner
  20 REM By Joe Telford
  30 REM For BBC B/B+/M/C/E/A
  40 REM (C) Acorn User October 1987
  50 :
  60 CLOSE# 0
  70 PROCreadfile("Clubdat")
  80 DIM spare$(fields%)
  90 PROCshmsort(1)
 100 PROCaddressdata
 110 END
 120 :
 130 DEF PROCshmsort(f%)
 140 PRINT"Shell-Metzner sort on field
";f%:TIME=0
 150 lists%=recno%
 160 REPEAT
 170 lists%=lists%/2
 180 IF lists%=0 THEN GOTO 310
 190 FOR list%=0 TO lists%-1
 200 REPEAT
 210 flag%=0
 220 ptr1%=list%
 230 ptr2%=list%+lists%
 240 REPEAT
```

Continued ▶

◀ Joe's Jottings listing 5 continued

```
250 IF file$(ptr1%,f%)>file$(ptr2%,f%)
 THEN PROCswap(ptr1%,ptr2%):flag%=1
260 ptr1%=ptr2%
270 ptr2%=ptr2%+lists%
280 UNTIL ptr2%>=recno%+1
290 UNTIL flag%=0
300 NEXT list%
310 UNTIL lists%=0
320 PROCtime
330 ENDPROC
```

Listing 6. Random file creator

```
 10 REM Random file creator
 20 REM By Joe Telford
 30 REM For BBC B/B+/M/C/E/A
 40 REM (C) Acorn User October 1987
 50 :
 60 CLOSE# 0
 70 ch%=OPENOUT ("Clubdat")
 80 RESTORE
 90 reclen%=277
100 fields%=11
110 FOR record%=1 TO 100
120 PRINT "Writing record ";record%
130 VDU 11
140 PTR# ch%=record%*reclen%
150 FOR field%=1 TO fields%
160 N$=STR$(RND(10000000))
170 PRINT# ch%,N$
180 NEXT
190 NEXT
200 PTR# ch%=0
210 PRINT
220 PRINT# ch%,record%-1,fields%,recle
n%
230 CLOSE# ch%
240 END
```

See Gain Control, page 95

Listing 1. Light control demonstration

```
    1 REM Light control demonstration
    2 REM by Peter Julian
    3 REM for BBC B/B+/M/C/E/A
    4 REM (C) Acorn User October 1987
    5 :
    6 ON ERROR VDU 4:REPORT:PRINT " at l
ine ";ERL:END
    7 MODE 1:VDU 24,870;0;1279;1023;28;3
1,26;19,3,2;0;
    8 PROCdisplay2:PROCsetup2:PROCreset
    9 :
   10 PRINT '"Type in your traffic ligh
t program,"'"beginning at line 10"''
  999 END
10000 REM main procedures
10010 :
10020 DEF PROCsetup1
10030 A=1:B=2:C=4:D=8
10040 E=16:F=32:G=64:H=128
10050 ENDPROC
10060 :
10070 DEF PROCsetup2
10080 *KEY 0 "PROCreset|M"
10090 *KEY 1 "PROCon("
10100 *KEY 2 "PROCoff("
10110 *KEY 3 "PROCpause("
10120 *KEY 4 "CLS|M LIST 10,9999|M"
10130 *KEY 5 "RUN|M"
```

Continued ▶

◀ Gain Control listing 1 continued

```
10140 *KEY 7 "FOR x = 1 TO "
10150 *KEY 8 "NEXT|M"
10160 *KEY 9 "PROChelp|M"
10170 *KEY 10 "OLD|MRUN|M"
10180 ENDPROC
10190 :
10200 DEF PROCon(N)
10210 IF FNout(N) LET N=0
10220 switch%=switch%+N
10230 PROCswitch
10240 ENDPROC
10250 :
10260 DEF FNout(N)
10270 IF (switch% AND N)=0 THEN =FALSE E
LSE =TRUE
10280 :
10290 DEF PROCpause(T)
10300 TIME=0
10310 REPEAT UNTIL TIME>INT(100*T)
10320 ENDPROC
10330 :
10340 DEF PROCoff(N)
10350 IF FNout2(N) THEN N=0
10360 switch%=switch%-N
10370 PROCswitch
10380 ENDPROC
10390 :
10400 DEF FNout2(N)
10410 IF (switch%-N AND N)=0 THEN =FALSE
 ELSE =TRUE
10420 :
10430 DEF PROCreset
10440 PROCsetup1
10450 switch%=0
10460 PROCswitch
10470 ENDPROC
10480 :
10490 DEF PROCbeep
10500 SOUND 1,-15,150,3
10510 ENDPROC
10520 :
10530 DEF PROChelp
10540 CLS
10550 COLOUR 3
10560 VDU 23,1,0;0;0;0;
10570 PRINT '"The following commands are
 available:-"''
10580 PRINT "PROCon(n)....Switches ON
e.g. PROCon(A) switches on the red light
"
10590 PRINT "          PROCon(A+E)..the
+ sign is used when more   than one ligh
t is switched"'
10600 PRINT "PROCoff(n)...Switches OFF"'
10610 PRINT "PROCpause(t).Delays for a
given time in seconds e.g. PROCpause(.5)
 pauses for   half a second"'
10620 PRINT "PROCreset....Switches OFF
ALL lights"'
10630 PRINT "PROCbutton...Halts the
program until SPACE BAR    is pressed"'
10640 PRINT "PROCbeep.....Makes a short
beep sound"'
10650 COLOUR 2:PRINT "Press SPACE BAR to
 continue":PROCbutton
10660 CLS
10670 COLOUR 3
10680 PRINT "Looping"''
10690 PRINT "When a group of commands"
10700 PRINT "are to be repeated use"
10710 PRINT "FOR x = 1 TO ?"
10720 PRINT "followed by the commands "
```

Continued ▶

YELLOW PAGES
CONTROL

◄ Gain Control listing 1 continued

```
10730 PRINT "which are to be repeated."
10740 PRINT "Finish with NEXT"'
10750 PRINT "'?' stands for the number"
10760 PRINT "of times the sequence is "
10770 PRINT "is repeated and should be"
10780 PRINT "replaced by a number eg:-"'
10790 PRINT "10 FOR x = 1 TO 6"
10800 PRINT "20 PROCon(B)"
10810 PRINT "30 PROCpause(1)"
10820 PRINT "40 PROCoff(B)"
10830 PRINT "50 PROCpause(1)"
10840 PRINT "60 NEXT"'
10850 PRINT "This makes the amber light"
10860 PRINT "flash 6 times."
10870 PRINT "Use red function keys f7,f8
"
10880 PRINT "Also use RUN and LIST on"
10890 PRINT "the function keys"'
10900 COLOUR 2
10910 PRINT "Start line numbering at 10"
10920 COLOUR 3
10930 VDU 23,1,1;0;0;0;
10940 ENDPROC
10950 :
10960 DEF PROCsign(c)
10970 VDU 5
10980 GCOL 0,c
10990 MOVE 908,300
11000 PRINT "WAIT"
11010 VDU 4
11020 ENDPROC
11030 :
11040 DEF PROCdisplay2
11050 LOCAL J
11060 VDU 5
11070 GCOL 0,2
11080 MOVE 950,0
11090 RESTORE 11130
11100 FOR J=1 TO 11
11110 READ a,b
11120 DRAW a,b
11130 DATA 950,250,900,250,900,320,950,3
20,950,384
11140 DATA 990,384,990,320,1040,320,1040
,250,990,250,990,0
11150 NEXT
11160 MOVE 920,384:DRAW 1020,384
11170 DRAW 1020,610:DRAW 920,610
11180 DRAW 920,384
11190 MOVE 1200,0:DRAW 1200,384
11200 DRAW 1240,384:DRAW 1240,0
11210 MOVE 1170,384:DRAW 1270,384
11220 DRAW 1270,610:DRAW 1170,610
11230 DRAW 1170,384
11240 GCOL 0,1:MOVE 875,0
11250 DRAW 875,1024:GCOL 0,2
11251 PROClist
11260 VDU 4
11270 ENDPROC
11280 :
11290 DEF PROCrman(x)
11300 VDU 5
11310 GCOL 0,x
11320 MOVE 956,600:PRINT"o"
11330 MOVE 970,590
11340 DRAW 970,550:DRAW 955,510
11350 MOVE 985,510
11360 DRAW 970,550:MOVE 955,550
11370 DRAW 970,590:DRAW 985,550
11380 VDU 4
11390 ENDPROC
11400 :
```

Continued ►

◄ Gain Control listing 1 continued

```
11410 DEF PROCgman(x)
11420 VDU 5
11430 GCOL 0,x
11440 MOVE 956,495:PRINT"o"
11450 MOVE 970,485:DRAW 970,435
11460 DRAW 960,395:MOVE 1000,390
11470 DRAW 970,435:MOVE 995,435
11480 DRAW 970,470:DRAW 955,450
11490 DRAW 970,435
11500 VDU 4
11510 ENDPROC
11520 :
11530 DEF PROCalight(x)
11540 VDU 5
11550 GCOL 0,x
11560 MOVE 1206,580:PRINT "*"
11570 MOVE 1206,580:PRINT "O"
11580 VDU 4
11590 ENDPROC
11600 :
11610 DEF PROCblight(x)
11620 VDU 5
11630 GCOL 0,x
11640 MOVE 1206,511:PRINT "*"
11650 MOVE 1206,511:PRINT "O"
11660 VDU 4
11670 ENDPROC
11680 :
11690 DEF PROCclight(x)
11700 VDU 5
11710 GCOL 0,x
11720 MOVE 1206,440:PRINT "*"
11730 MOVE 1206,440:PRINT "O"
11740 VDU 4
11750 ENDPROC
11760 :
11770 DEF PROCswitch
11780 IF(switch% AND A)=0 THEN PROCaligh
t(0) ELSE PROCalight(1)
11790 IF(switch% AND B)=0 THEN PROCbligh
t(0) ELSE PROCblight(2)
11800 IF(switch% AND C)=0 THEN PROCcligh
t(0) ELSE PROCclight(3)
11810 IF(switch% AND D)=0 THEN PROCrman(
0) ELSE PROCrman(1)
11820 IF(switch% AND E)=0 THEN PROCgman(
0) ELSE PROCgman(3)
11830 IF(switch% AND F)=0 THEN PROCsign(
0)  ELSE PROCsign(2)
11840 ENDPROC
11850 :
11860 DEF PROCbutton
11870 *FX 21,0
11880 REPEAT UNTIL GET$=CHR$(&20)
11890 ENDPROC
11900 :
11910 DEF PROClist
11920 VDU 5
11930 MOVE 885,1000
11940 PRINT "Red light..A"
11950 MOVE 885,950
11960 PRINT "Amber .....B"
11970 MOVE 885,900
11980 PRINT "Green .....C"
11990 MOVE 885,850
12000 PRINT "Red man ...D"
12010 MOVE 885,800
12020 PRINT "Green man..E"
12030 MOVE 885,750:PRINT "WAIT.......F"
12040 VDU 4
12050 ENDPROC
```

Listing 2. *User* port control

```
1 REM User port control
2 REM by Peter Julian
3 REM for BBC B/B+/M with interface
4 REM (C) Acorn User October 1987
5 :
6 ON ERROR VDU 4:REPORT:PRINT " at l
ine "; ERL:END
7 MODE 1:VDU 24,0;900;1279;1023;28,0
,31,39,4:GCOL 0,129:CLG:*FX 229,0
8 PROCdisplay:PROCreset
9 :
10 PRINT ''"Type in your control prog
ram,"''"beginning at line 10"''
999 END
10000 REM main procedures
10010 :
10020 DEF PROCsetup
10030 A=1:B=2:C=4:D=8:E=16:F=32:G=64:H=1
28
10040 *KEY 0 "PROCreset|M"
10050 *KEY 1 "PROCon("
10060 *KEY 2 "PROCoff("
10070 *KEY 3 "PROCpause("
10080 *KEY 4 "CLS|M LIST 10,9999|M"
10090 *KEY 5 "RUN|M"
10100 *KEY 6 "FNinputon("
10110 *KEY 7 "FOR x = 1 TO "
10120 *KEY 8 "NEXT|M"
10130 *KEY 9 "PROCtest|M"
10140 *KEY 10 "OLD|MRUN|M"
10150 ENDPROC
10160 :
10170 DEF PROCon(N)
10180 IF FNout(N) THEN N=0
10190 ?&FE61=?&FE61+N
10200 PROCdisp1
10210 ENDPROC
10220 :
10230 DEF FNout(N)
10240 =((?&FE61 AND N) <> 0)
10250 :
10260 DEF FNinputon(N)
10270 =((?&FE60 AND N) <> 0)
10280 :
10290 DEF PROCpause(T)
10300 TIME=0
10310 REPEAT
10320 UNTIL TIME>INT(100*T)
10330 ENDPROC
10340 :
10350 DEF PROCoff(N)
10360 IF FNout2(N) THEN N=0
10370 ?&FE61=?&FE61-N
10380 PROCdisp1
10390 ENDPROC
10400 :
10410 DEF FNout2(N)
10420 =((?&FE61-N AND N) <> 0)
10430 :
10440 DEF PROCreset
10450 PROCsetup
10460 ?&FE61=0
10470 PROCdisp1
10480 ENDPROC
10490 :
10500 DEF PROCbeep
10510 SOUND 1,-15,150,3
10520 ENDPROC
10530 :
10540 DEF PROCdisplay
10550 LOCAL Y
10560 VDU 5
10570 GCOL 0,2
10580 MOVE 10,965
```

Continued ▶

◀ Gain Control listing 2 continued

```
10590 PRINT "OUTPUTS"
10600 MOVE 300,990
10610 PRINT "H    G    F    E    D    C    B
 A"
10620 RESTORE 10700
10630 FOR T=1 TO 8
10640 READ Y
10650 MOVE Y,950
10660 GCOL 0,0
10670 PRINT "O"
10680 NEXT
10690 VDU 4
10700 DATA 300,428,557,684,815,940,1070,
1198
10710 ENDPROC
10720 :
10730 DEF PROCdisp1
10740 RESTORE 10830
10750 FOR J=1 TO 8
10760 LOCAL X,Z
10770 READ X,Z
10780 VDU 5
10790 MOVE Z,950
10800 IF(?&FE61 AND X)=0 THEN GCOL 0,0:P
RINT "O":ELSE GCOL 0,3:PRINT "O"
10810 NEXT J
10820 VDU 4
10830 DATA 128,300,64,428,32,557,16,684
10840 DATA 8,815,4,940,2,1070,1,1198
10850 ENDPROC
10860 :
10870 DEF PROCbutton
10880 *FX 21,0
10890 REPEAT UNTIL GET$=CHR$(&20)
10900 ENDPROC
10910 :
10920 DEF PROCtest1
10930 LOCAL X,p
10940 RESTORE 10990
10950 FOR J=1 TO 8
10960 READ X,p
10970 IF (?&FE60 AND X)=0 THEN PRINT TAB
(p,10) "O" ELSE COLOUR 2:PRINT TAB(p,10)
 "O":COLOUR 3
10980 NEXT J
10990 DATA 1,29,2,26,4,23,8,20,16,17,32,
14,64,11,128,8
11000 ENDPROC
11010 :
11020 DEF PROCtest
11030 VDU 23,1,0;0;0;0;
11040 CLS
11050 PRINT TAB(12,6) "* Input Test *"
11060 PRINT TAB(8,8) "H  G  F  E  D  C
B  A"
11070 COLOUR 1
11080 PRINT TAB(0,13) "PROCtest cannot b
e used in a program"
11090 COLOUR3
11100 REPEAT
11110 PROCtest1
11120 UNTIL INKEY -99
11130 PRINT TAB(0,15)
11140 END
```

Gain Control. Crossing lights by 13-year-old Stephen Cripps

```
10 PROCon (D+C)
20 PROCbutton
30 PROCon (F)
40 PROCpause (2)
50 PROCoff (C)
```

Continued ▶

◄ **Gain Control listing 3 continued**

```
 60 PROCon (B)
 70 PROCpause (2)
 80 PROCoff (F+D+B)
 90 PROCon (E+A)
100 FOR I% = 1 TO 6
110 PROCbeep
120 PROCpause (0.5)
130 NEXT
140 PROCoff (E+A)
150 FOR I% = 1 TO 6
160 PROCon (F+E+B)
170 PROCpause (0.5)
180 PROCoff (F+E+B)
190 PROCpause (0.5)
200 NEXT
210 GOTO 10
```

Listing 4. Crossing lights program 2 by 10 year-old Jean Paul Bourdais

```
 10 PROCon (C+D)
 20 CLS
 30 PRINT "Press SPACE bar to start"
 40 PROCbutton
 50 CLS
 60 PROCon (F)
 70 PROCpause (3)
 80 PROCoff (C)
 90 PROCon (B)
100 PROCpause (3)
110 PROCoff (B+D+F)
120 PROCon (A+E)
130 FOR I% = 1 TO 5
140 PROCbeep
150 PROCpause (0.4)
160 NEXT I%
170 PROCoff (A)
180 PROCon (B)
190 FOR I% = 1 TO 5
200 PROCon (B+E)
210 PROCpause (0.2)
220 PROCoff (B+E)
230 PROCpause (0.2)
240 NEXT I%
250 PROCreset
260 GOTO 10
```

See Network Page, page 153

Listing 1. Cataloguer program

```
 10 REM Network Catalogue Program
 20 REM by Robin Newman
 30 REM for BBC B/B+/M/C with Econet
 40 REM (C) Acorn User October 1987
 50 :
 60 MODE 7
 70 *NET
 80 PROCinit
 90 ON ERROR PROCerror:END
100 :
110 fc=yellow: REM file
120 dc=magenta: REM directory
130 barc=blue: REM highlight bar
140 hlc=magenta: REM text highlight
150 ownc=white: REM dir. owner
160 pubc=blue: REM dir. public
170 txtc=green: REM text instr.
180 :
190 PROCtitle
200 PROCwait(0.01)
```

Continued ►

◄ **Network Page listing 1 continued**

```
210 PROCassm
220 path$(0)=MID$(FNprivname,2)
230 REPEAT
240 CALL code
250 IF pb?3<>0 THEN END
260 N%=?num
270 newdir=FALSE
280 page=0
290 pagemax=N% DIV 45
300 LMAX%=0
310 PROCdisplay(0)
320 IF newdir UNTIL FALSE
330 PROCinstructions
340 PROCselect
350 UNTIL FALSE
360 :
370 DEF FNsj
380 LOCAL A%,X%,Y%
390 ?data=0:data!1=10:data!3=25
400 X%=data MOD 256
401 Y%=data DIV 256
410 A%=&14
411 CALL osword
420 =(LEFT$($(data+4),2)="SJ")
440 :
450 DEF PROCassm
460 FOR Z%=0 TO 2 STEP 2
461 P%=code
470 [OPT Z%
480 LDA #(pb+6) MOD 256
490 STA &70
500 LDA #(pb+6) DIV 256
510 STA &71
520 LDA #data MOD 256
530 STA &72
540 LDA #data DIV 256
550 STA &73
560 LDA #0
570 STA pt
580 STA num
590 .nxtbit
600 JSR copy
610 LDA pt
620 STA pb+8
630 JSR call
640 LDA pb+3
650 BEQ ok
660 .error
670 LDY #4
680 .errlp
690 LDA pb,Y
700 JSR osasci
710 INY
720 CMP #13
730 BNE errlp
740 RTS
750 .ok
760 JSR shift
770 LDA pb+4
780 PHA
790 CLC
800 ADC num
810 STA num
820 PLA
830 CMP #4
840 BNE exit
850 LDA pt
860 CLC
870 ADC #4
880 STA pt
890 BNE nxtbit
900 .exit
910 RTS
```

Continued ►

YELLOW PAGES

NETWORK PAGE

◄ **Network Page listing 1 continued**

```
920 .shift
930 LDY#107
940 .nxsh
950 LDA (&70),Y
960 STA (&72),Y
970 DEY
980 BPL nxsh
990 LDA #108
1000 CLC
1010 ADC &72
1020 STA &72
1030 BCC skip
1040 INC &73
1050 .skip
1060 RTS
1070 .call
1080 LDA #&14
1090 LDX #pb MOD 256
1100 LDY #pb DIV 256
1110 JMP osword
1120 .copy
1130 LDY #19
1140 .nxy
1150 LDA p2,Y
1160 STA pb,Y
1170 DEY
1180 BPL nxy
1190 RTS
1200 .getname
1210 LDY seek
1220 LDA #data MOD 256
1230 STA &74
1240 LDA #data DIV 256
1250 STA &75
1260 CPY #0
1270 BEQ got
1280 CLC
1290 .nxseek
1300 LDA &74
1310 ADC #27
1320 STA &74
1330 LDA #0
1340 ADC &75
1350 STA &75
1360 DEY
1370 BNE nxseek
1380 .got
1390 LDY #9
1400 .place
1410 LDA (&74),Y
1420 STA F+1,Y
1430 DEY
1440 BPL place
1450 LDA #13
1460 STA F+11
1470 LDY #18
1480 LDA (&74),Y
1490 AND #&20
1500 BNE dir
1510 LDA #fc
1520 BNE colour
1530 .dir
1540 LDA#dc
1550 .colour
1560 STA F
1570 RTS
1580 OPT FNdata
1590 ]
1591 NEXT
1600 $name=""
1610 ENDPROC
1620 :
1630 DEF FNname(S%)
1640 ?seek=S%
1650 CALL getname
1660 =$F
1670 :
1680 DEF PROCaddr(S%)
1690 L$=STR$~data!(S%*27+10)
1700 E$=STR$~data!(S%*27+14)
1710 S$=STR$~((data!(S%*27+24))AND&FFFF
FF)
1720 ac%=(data?(S%*27+18))
1730 IF FNowner(entry) THEN ra%=((ac%AN
D4)<>0) ELSE ra%=((ac%AND1)<>0)
1740 ac$=FNas(ac%)
1750 IF sj% AND (ac%AND&40)<>0 ac$="P"+
ac$
1760 ENDPROC
1770 :
1780 DEF FNas(ac%)
1790 LOCAL X%,A$
1800 atr$=FNatrib
1810 FOR X%=1 TO 6
1820 IF X%=5 A$=A$+"/"
1830 IF (ac% AND &20)=&20 A$=A$+MID$(at
r$,X%,1)
1840 ac%=(2*ac%) AND &3F
1850 NEXT
1860 =A$
1870 :
1880 DEF FNatrib
1890 IF NOT sj% THEN ="DLWRWR"
1900 IF FNowner(entry) THEN ="DLWRwr"
1910 ="DLwrWR"
1920 :
1930 DEF PROCdisplay(P%)
1940 CLS
1950 VDU 28,0,19,39,3
1960 VDU 31,39,15,156
1970 PROCboxoff
1980 IF up THEN page=P(p):P%=page*45
1990 IF page>0 THEN PRINT TAB(0,0) CHR$
hlc;"[ More Files"
2000 PRINT TAB(15,0) FNprivname
2010 IF page<pagemax THEN PRINT TAB(27,
0) CHR$hlc;"More Files ]";
2020 IF N%=0 THEN PRINT TAB(5,5) CHR$tx
tc;"No files: empty directory!"
2021 IF N%=0 AND p>0 THEN PROCupdir
2030 IF N%=0 THEN ENDPROC
2040 end%=FALSE
2050 FOR C%=0 TO 2
2060 B%=P%+C%*15
2070 V%=N%-1-B%
2080 H%=C%*13+2
2090 FOR L%=0 TO 14
2100 IF L%>V% THEN end%=TRUE:LMAX%=B%+L
%-1-P%:L%=14:GOTO2120
2110 PRINT TAB(H%,L%+1) FNname(B%+L%);
2120 NEXT
2130 IF end% THEN C%=2
2140 NEXT
2150 ENDPROC
2160 :
2170 DEF PROCselect
2180 IF N%=0 THEN PROCs:PROCexit:END
2190 LOCAL X%,Y%,S%
2200 IF up THEN S%=S(p):NS%=S%:page=P(p
) ELSE S%=0:NS%=0
2210 REPEAT
2220 X%=13*(S%DIV15)
2230 Y%=1+S%MOD15
2240 IF NOT(X%>25 AND Y%=15) THEN VDU 3
1,X%+13,Y%,156
2250 VDU 31,X%,Y%,barc,157
```

Continued ►

◄ Network Page listing 1 continued

```
2260 up=FALSE
2270 TIME=0
2280 REPEAT UNTIL FNkeyclear OR TIME>5+
delay
2290 delay=0
2300 IF INKEY(-42) THEN NS%=S%+1:GOTO23
70
2310 IF INKEY(-58) THEN NS%=S%-1:GOTO23
70
2320 IF INKEY(-26) THEN NS%=S%-15:GOTO2
370
2330 IF INKEY(-122) THEN NS%=S%+15:GOTO
2370
2340 IF INKEY(-74) THEN PROCprint
2350 IF INKEY(-25) THEN PROCupdir
2360 IF newdir UNTIL TRUE:ENDPROC ELSE
GOTO2300
2370 IF NS%<0 AND page>0 THEN PROCscree
n("left"):NS%=FNnewns("left") ELSE IF NS
%<0 NS%=S%:PROCs
2380 IF NS%>44 AND page<pagemax THEN PR
OCscreen("right"):NS%=FNnewns("right") E
LSE IF NS%>44 OR (page=pagemax AND NS%>L
MAX%) NS%=S%:PROCs
2390 VDU 31,X%+1,Y%,156
2400 S%=NS%
2410 UNTIL FALSE
2420 ENDPROC
2430 :
2440 DEF PROCscreen(D$)
2450 IF D$="right" page=page+1 ELSE pag
e=page-1
2460 PROCdisplay(page*45)
2470 ENDPROC
2480 :
2490 DEF FNnewns(D$)
2500 IF D$="left" AND NS%=-1 THEN=44
2510 IF D$="left" =S%+30
2520 IF NS%<>45 AND page=pagemax AND S%
-30>LMAX% THEN =LMAX%
2530 IF NS%=45 THEN =0
2540 =S%-30
2550 :
2560 DEF FNkeyclear
2570 LOCAL A%,X%,Y%
2580 A%=121:X%=0:Y%=0
2610 =((USR(osbyte)AND &FF00)=&FF00)
2620 :
2630 DEF PROCinit
2640 DIM code &200,data &1B00,F 12,osc
20,own 30,path$(30),S(30),P(30)
2650 red=129:green=130
2660 yellow=131:blue=132
2670 magenta=133:cyan=134
2680 white=135
2690 osbyte=&FFF4:osword=&FFF1
2700 osgbpb=&FFD1:osasci=&FFE3
2710 oscli=&FFF7:osfind=&FFCE
2720 delay=0:p=0:first=TRUE
2730 up=FALSE
2740 sj%=FNsj
2750 *FX 4,2
2760 VDU 23,1,0;0;0;0;
2770 ENDPROC
2780 :
2790 DEF PROCtitle
2800 PRINT TAB(4,0) CHR$141;CHR$fc;"Aco
rn User Network Cataloguer"
2810 PRINT TAB(4) CHR$141;CHR$fc;"Acorn
 User Network Cataloguer"
2820 PRINT CHR$(barc+16);CHR$154;STRING
$(37,CHR$252)
2830 VDU 28,0,24,39,3
```

Continued ►

◄ Network Page listing 1 continued

```
2840 ENDPROC
2850 :
2860 DEF PROCprint
2870 entry=page*45+S%
2880 PROCaddr(entry)
2890 IF INSTR(ac$,"D")<>0 THEN PROCdir:
ENDPROC
2900 PROCclear
2910 IF FNnamestrip(entry)="...Private"
 THEN PROCboxon:PROCnogo:GOTO2980
2920 PROCboxon
2930 PRINT CHR$hlc;"Load   "CHR$fc;L$
2940 PRINT CHR$hlc;"Exec   "CHR$fc;E$
2950 PRINT CHR$hlc;"Len    "CHR$fc;S$
2960 PRINT CHR$hlc;"Access"CHR$fc;ac$
2970 PROCoptions
2980 PROCboxoff
2990 REPEAT
3000 IF INKEY(-49) AND ra% UNTILTRUE:PR
OCexit:PROCload:END
3010 IF INKEY(-50) AND ra% UNTILTRUE:PR
OCexit:PROCchain:END
3020 IF INKEY(-18) AND ra% UNTILTRUE:PR
OCexit:PROCstload:END
3030 IF INKEY(-19) AND ra% UNTILTRUE:PR
OCexit:PROCstrun:END
3040 IF INKEY(-58) OR INKEY(-42) OR INK
EY(-26) OR INKEY(-122) OR INKEY(-25) THE
N PROCclear:PROCinstructions:UNTILTRUE:d
elay=30:ENDPROC
3050 UNTIL FALSE
3060 :
3070 DEF PROCoptions
3080 VDU 28,18,24,39,20,12
3090 IF ra% THEN PROCaccok ELSE PROCnog
o
3100 ENDPROC
3110 :
3120 DEF PROCnogo
3130 PRINT'CHR$txtc;"Insufficient Acces
s"
3140 PRINT CHR$txtc;"to load this file"
3150 VDU 28,0,24,39,19
3160 PRINT TAB(5,5) CHR$txtc;"Press Arr
ow Keys to continue";
3170 ENDPROC
3180 :
3190 DEF PROCaccok
3200 PRINT CHR$hlc;"1";CHR$fc;"LOAD ""<
fname>"""
3210 PRINT CHR$hlc;"2";CHR$fc;"CHAIN""<
fname>"""
3220 PRINT CHR$hlc;"3";CHR$fc;"*LOAD <f
name>"
3230 PRINT CHR$hlc;"4";CHR$fc;"*RUN  <f
name>"
3240 VDU 28,0,24,39,19
3250 PRINT TAB(0,5) CHR$txtc;"Press num
ber or Arrow keys to continue";
3260 ENDPROC
3270 :
3280 DEF PROCclear
3290 PROCboxon
3300 CLS
3310 PROCboxoff
3320 ENDPROC
3330 :
3340 DEF PROCload
3350 PROCinsert("LO."""+FNnamestrip(ent
ry)+"""")
3360 ENDPROC
3370 :
3380 DEF PROCchain
```

Continued ►

◄ Network Page listing 1 continued

```
 3390 PROCinsert("CH."""+FNnamestrip(ent
ry)+"""")
 3400 ENDPROC
 3410 :
 3420 DEF PROCstload
 3430 PROCinsert("*LO. "+FNnamestrip(ent
ry))
 3440 ENDPROC
 3450 :
 3460 DEF PROCstrun
 3470 PROCinsert("*RUN "+FNnamestrip(ent
ry))
 3480 ENDPROC
 3490 :
 3500 DEF PROCinsert(A$)
 3510 LOCAL A%,X%,Y%,Z%
 3520 CLS
 3530 *FX 15
 3540 A%=138:X%=0
 3550 FOR Z%=1 TO LEN(A$)
 3560 Y%=ASC MID$(A$,Z%,1)
 3570 IF Y%<127 THEN CALLosbyte
 3580 NEXT
 3590 *FX 138,0,13
 3600 ENDPROC
 3610 :
 3620 DEF PROCexit
 3630 IF p>0 THEN PROCod:PROCoscli("DIR
"+FNpathname)
 3640 VDU 26,12,23,1,1;0;0;0;
 3670 *FX 4
 3680 REPEAT UNTIL FNkeyclear
 3690 *FX 15
 3700 ENDPROC
 3710 :
 3720 DEF PROCdir
 3730 LOCAL A$
 3740 PROCwait(0.4)
 3750 A$=FNnamestrip(entry)
 3760 S(p)=S%
 3761 P(p)=page
 3762 newdir=TRUE
 3770 PROCdowndir(A$)
 3780 p=p+1
 3781 path$(p)=A$
 3790 ENDPROC
 3800 :
 3810 DEF FNnamestrip(entry)
 3820 LOCAL A$
 3830 A$=MID$(FNname(entry),2)
 3840 IF INSTR(A$," ")<>0 THEN A$=LEFT$(
A$,INSTR(A$," ")-1)
 3850 =A$
 3860 :
 3870 DEF PROCoscli($osc)
 3880 LOCAL X%,Y%
 3890 X%=osc MOD 256
 3900 Y%=osc DIV 256
 3910 CALL oscli
 3920 ENDPROC
 3930 :
 3940 DEF PROCupdir
 3950 IF p=0 PROCs:ENDPROC
 3960 PROCwait(0.4)
 3961 p=p-1:p$=FNpathname
 3970 IF NOT first THEN PROCod
 3980 IF p>0 THEN PROCnd(p$) ELSE first=
TRUE
 3990 newdir=TRUE
 4000 up=TRUE
 4010 ENDPROC
 4020 :
 4030 DEF FNpathname
```

Continued ►

◄ Network Page listing 1 continued

```
 4040 LOCAL Z%,p$
 4050 FOR Z%=1 TO p
 4060 p$=p$+"."+path$(Z%)
 4070 NEXT
 4080 =MID$(p$,2)
 4090 :
 4100 DEF PROCwait(T)
 4110 LOCAL W
 4120 W=TIME
 4130 PROCclear
 4140 PROCboxon
 4150 PRINTCHR$fc"Please wait..."
 4160 PROCboxoff
 4170 REPEAT UNTIL TIME>W+T*100
 4180 ENDPROC
 4190 :
 4200 DEF PROCnd(N$)
 4210 LOCAL A%,X%,Y%
 4220 first=FALSE
 4230 X%=F MOD 256
 4231 Y%=F DIV 256
 4240 A%=&13
 4241 !F=6
 4242 CALL osword
 4250 csave=!F
 4260 F!2=FNopen(N$)
 4270 IF F!2=0 THEN PROCexit:PRINT'"Fata
l error: can't open ";N$:END
 4280 ?F=7:CALLosword
 4290 ENDPROC
 4300 :
 4310 DEF PROCod
 4320 LOCAL A%,X%,Y%
 4330 X%=F MOD 256
 4340 Y%=F DIV 256
 4349 A%=&13
 4350 !F=6
 4351 CALLosword
 4360 CLOSE# F?2
 4370 !F=csave
 4371 ?F=7
 4372 CALLosword
 4380 first=TRUE
 4390 ENDPROC
 4400 :
 4410 DEF FNopen($osc)
 4420 LOCAL A%,X%,Y%
 4430 X%=osc MOD 256
 4440 Y%=osc DIV 256
 4450 A%=&40
 4460 =USR(osfind) AND &FF
 4470 :
 4480 DEF PROCdowndir(A$)
 4490 IF first THEN PROCnd(A$) ELSE PROC
oscli("DIR "+A$)
 4500 first=FALSE
 4510 ENDPROC
 4520 :
 4530 DEF PROCinstructions
 4540 PROCboxon
 4550 PRINT CHR$txtc;"Filenames are colo
ured";CHR$fc;CHR$255;CHR$txtc;"directori
es";CHR$dc;CHR$255
 4560 PRINT CHR$txtc;"Use arrow keys to
highlight entry, then";CHR$fc;"<return>"
;CHR$txtc;"shows load options or enters"
 4570 PRINT CHR$txtc;"directory.";CHR$fc
;"^";CHR$txtc;"enters parent directory."
;
 4580 PROCboxoff
 4590 ENDPROC
 4600 :
 4610 DEF PROCs
```

Continued ►

YELLOW PAGES

TOP OF THE LIST

◄ Network Page listing 1 continued

```
4620 SOUND 1,-12,100,2
4630 REPEAT UNTIL FNkeyclear
4640 ENDPROC
4650 :
4660 DEF PROCboxon
4670 VDU 28,0,24,39,19,12
4680 PRINT CHR$148;CHR$154;STRING$(37,C
HR$172)
4690 ENDPROC
4700 :
4710 DEF FNprivname
4720 LOCAL A%,X%,Y%
4730 X%=osc MOD 256
4740 Y%=osc DIV 256
4750 A%=6
4751 osc!1=F
4752 CALL osgbpb
4760 priv=?(F+2+F?1)
4762 ?(F+2+F?1)=13
4770 IF priv=0 THEN F?1=ownc ELSE F?1=p
ubc
4780 =$(F+1)
4790 :
4800 DEF FNowner(entry)
4810 IF NOT sj% THEN =(priv=0)
4820 LOCAL A%,X%,Y%
4830 X%=own MOD 256
4840 Y%=own DIV 256
```

Continued ►

◄ Network Page listing 1 continued

```
4850 A%=&14
4860 !own=&12001200
4870 own!4=&5000000
4880 $(own+8)=FNnamestrip(entry)
4890 CALL osword
4900 =(own?19=0)
4910 :
4920 DEFPROCboxoff
4930 VDU 28,0,18,39,3
4940 ENDPROC
4950 :
4960 DEF PROCerror
4970 ON ERROR OFF
4980 PROCexit
4990 IF ERR<>17 THEN REPORT:PRINT" at l
ine ";ERL
5000 ENDPROC
5010 :
5020 DEF FNdata
5030 pt=P%
5040 RESTORE
5050 FOR n=pt TO pt+20 STEP 4
5060 READ !n
5070 NEXT
5080 num=pt+1:seek=num+1:p2=seek+1
5090 name=p2+10:pb=name+10
5100 =Z%
5110 :
5120 DATA 0,&30012,0,&20202004,&2020202
0,&202020
```

Top of the list

*This month's extra is a new utility from Dr Mike Smith of Truro. Type in and run the listing – it saves a machine code file called 'Keep'. Now simply typing *KEEP will save your Basic program to disc. The filename is taken automatically from the first line of your program, which must be a REM with a single word as shown in the listing itself.*

```
  10 REM Keeper
  20 REM by Dr M Smith
  30 REM for B/B+/M/C/E
  40 REM (C) Acorn User Oct
ober 1987
  50 :
  60 FOR pass=0 TO 3 STEP 3
  70 P%=&900
  80 [OPT pass
  90 LDA &18
 100 STA &81
 110 LDA #&5
 120 STA &80
 130 LDX #&0
 140 LDY #&FF
 150 .loop
 160 INY
 170 LDA (&80),Y
 180 CMP #&20
 190 BEQ loop
 200 STA buffer,X
 210 INX
 220 CMP #&0D
 230 BNE loop
 240 PHP
 250 PHA:TXA:PHA:TYA:PHA
 260 LDA #&07
 270 JSR &FFE3
 280 LDA #buffer MOD256
 290 STA param
 300 LDA #buffer DIV256
 310 STA param+1
 320 LDA #0
 330 STA param+2
 340 LDA &18
 350 STA param+3
 360 LDA #&23
 370 STA param+6
 380 LDA #&80
 390 STA param+7
 400 LDA #&00
 410 STA param+10
 420 LDA &18
 430 STA param+11
 440 LDY &12
 450 INY
 460 TYA
 470 STA param+14
 480 LDA &13
 490 STA param+15
 500 LDA #0
 510 STA param+4
 520 STA param+5
 530 STA param+8
 540 STA param+9
 550 STA param+12
 560 STA param+13
 570 STA param+16
 580 STA param+17
 590 LDX #param MOD256
 600 LDY #param DIV256
 610 JSR &FFDD
 620 LDX #0
 630 .loop1
 640 LDA mess1,X
 650 BEQ next
 660 JSR &FFE3
 670 INX
 680 JMP loop1
 690 .next
 700 LDX #0
 710 .loop2
 720 LDA buffer,X
 730 CMP #&0D
 740 BEQ next1
 750 JSR &FFE3
 760 INX
 770 JMP loop2
 780 .next1
 790 LDX #0
 800 .loop3
 810 LDA mess2,X
 820 BEQ next2
 830 JSR &FFE3
 840 INX
 850 JMP loop3
 860 .next2
 870 PLA:TAY:PLA:TAX:PLA
 880 PLP
 890 RTS
 900 .mess1
 910 EQUS "FILE "
 920 EQUB 0
 930 .mess2
 940 EQUS " SAVED"
 950 EQUB &0D
 960 EQUB 0
 970 .param
 980 ]
 990 P%=P%+&12
1000 [
1010 .buffer
1020 ] NEXT
1030 *SAVE KEEP 900 9BC 900
```

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☐ SEP 0028-0	☐ AUG 0039-6	☐ SEP 0052-3
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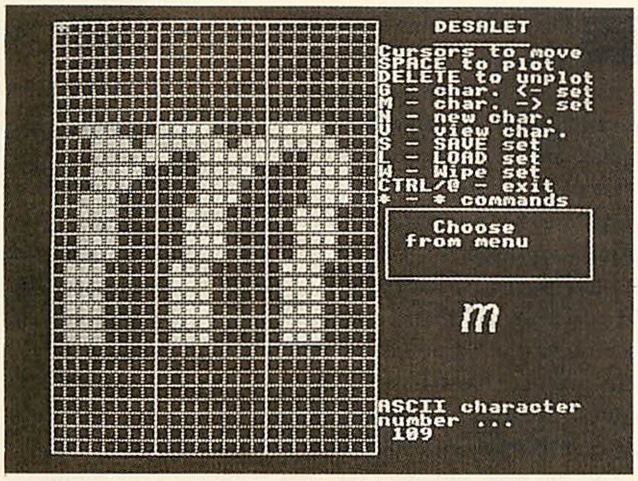
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OFFERS

C A L L I G R A P H Y



A new dimension in letter designing

BBC/B/B+/M/ This is your chance to produce your own letterheads and posters to a professional standard, with the minimum of fuss and effort. *Acorn User*'s *Calligraphy* disc has been compiled due to popular demand and contains all the programs needed to produce letter designs that will impress your friends and colleagues.

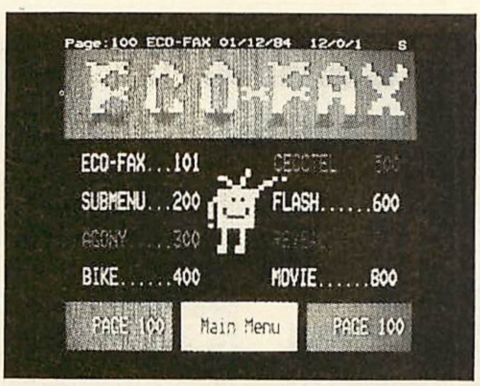
The *Desalet* program is a simple font creator which produces customised letters, to your personal design. It will save you from using repetitive data statements and error prone calculations. You can save your font set on disc and then call it up as needed. All previously saved sets can be modified or added to, and each set covers up to 94 characters.

Modical, a modification of the original *Calligraphy* program (September 1986 *Acorn User*) is also included on the disc. *Modical* allows the use of disc-based font sets created with *Desalet*. *Modical* also incorporates a modified file creation program, which permits files to be printed out immediately or saved for later printing.

An enhanced font ROM in the form of a sideways RAM image, is also on the disc. This allows you to design your own fonts for use on-screen. Any output to the printer will be in the new font – thus giving true WYSIWYG capabilities. There is a selection of new fonts to help you get started.

This superb disc comes in 5.25-inch, 40/80-track format and is great value at only £9.95.

L I S T I N G S

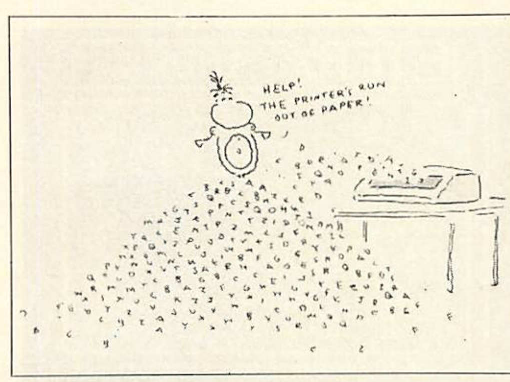


Easy learning with Education disc

BBC/B/B+/M/C The *Acorn User* Education disc makes learning easy and enjoyable. The disc is packed with useful programs, including the *Eco-fax* database for Econets.

Graphics are a strong feature, and included on the disc are *Turtle Logo*, *Easyplot* and *Bulletin*, and you can then show off your creations with *Vufoil* and *Noticeboard* or make music with *Tunemaker*. Also included are an all-mode dumping routine for Epson compatibles and a teletext dumping routine for mode 7 dumping to Epson FX80 compatibles. All this for only £7.95.

D I S C S



Printer advice with Printer Help disc

BBC/B/B+/M/C Often printer manuals don't fully cover the Master and BBC micro – our disc will help you to understand your printer's facilities for just £7.95.

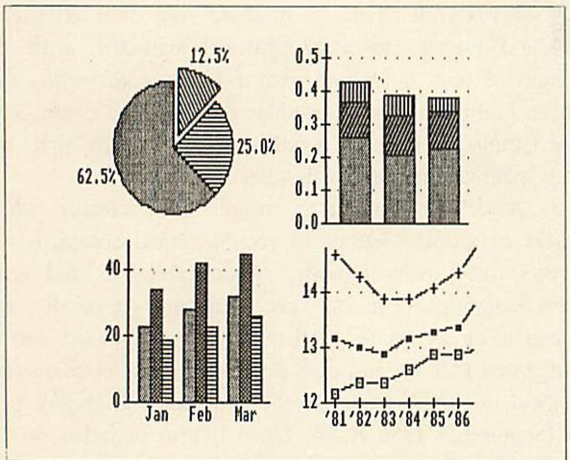
The 5.25-inch *Printer Help* disc illustrates various print type styles, use of *Wordwise* and *View*, screen images and printer care. There is an ASCII standard codes table and clear diagrams illustrating stages of printer use including advice on what to do if things go wrong.

For compatibility details write to Seran, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF.

Acorn User order form on page 129 – 24 hour telephone service (0672) 40825

OFFERS

C H A R T S O F T W A R E



Improve your presentation with ViewChart

BBC/B/ B+/M/ C

Do you use your micro to prepare figures? Perhaps in *ViewSheet* or *ViewStore*? Do you make printed reports? This business graphics program from *Acorn User* contributor Peter Sandford is aimed at anyone who uses figures, and wishes to improve the quality of their work.

ViewChart takes your numeric data from a *ViewSheet* or *ViewStore* file, or manual input, and plots various chart formats to screen. In one plot you can produce between one and five piecharts, stacked bar charts up to 25 bars, grouped bar charts up to 24 bars and line graphs with up to five lines each of 40 plotted points.

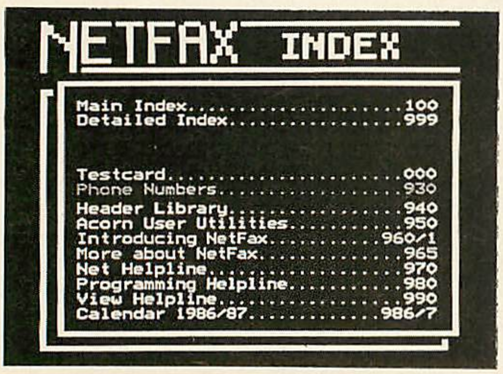
In practice, most business presentation data such as sales figures, departmental breakdowns, cost analyses and so on can be presented in a form even the boss will understand!

You can even add extra text and graphics to the completed chart prior to saving or printing. A screen dump program is provided, for Epson and compatible printers, which is specifically designed to fit the width of an A4 page. Instructions are provided on interfacing to other printers. *ViewChart* works in screen mode 0, using full shading effects, so what you see on screen is what you get on paper, and includes some tips on final presentation of graphics in documents.

ViewChart is supplied on 40-track 5.25-inch disc and works on the BBC models B and B+ and Master 128.

And the price of this professional software? Just £12.95.

D I S C S



Network utilities for better communication

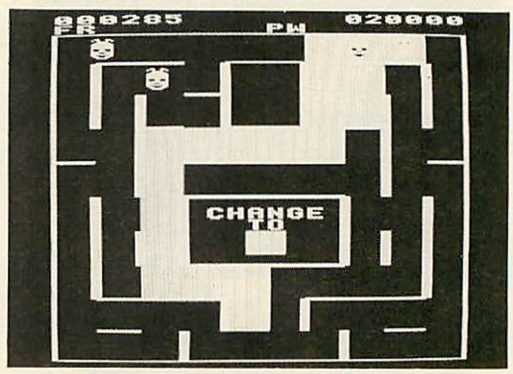
BBC/B/ B+/M/ C

The *Network Utilities* 80-track disc is the logical addition to your network, combining invaluable routines with a sophisticated yet easy-to-use noticeboard.

Included is *Netfax*, our own hybrid information system providing access to thousands of pages of information. Other special features are: a file locator and directory size finder; network manager utilities including a bridge compatible screen viewer and a 'notify all' facility.

Plus there are 150 *Netfax* pages covering instructions, help and indexes, all on a 5.25-inch disc for £19.95.

C A S S E T T E S



Games galore in our compendium cassette

BBC/B/ B+/M/ E

You can guide Shuggy around his garden; puzzle over *Puzzle*, and be *3-D* amazed. Or destroy submarines with *Run Silent, Run Deep*. And for the really adventurous, go round the *Acorn User* office.

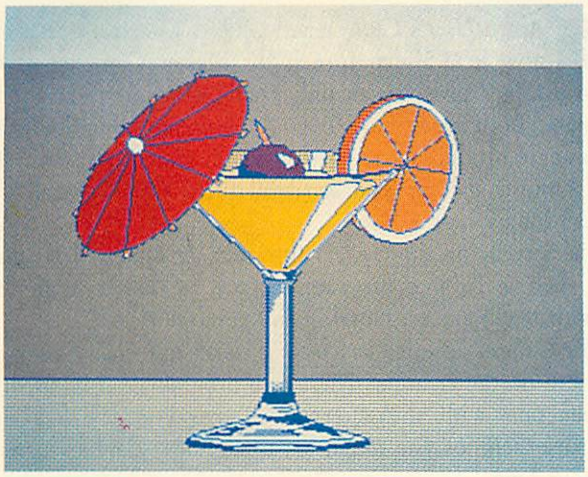
Best of all, try the truly different *Adventure* game written especially for the *Games Compendium* cassette by Rob Anderson. It's excellent value at £3.95.

You will also find David Acton's *Spectramania* and *Quadline* on this cassette: beat your micro, get four in a row. All are easily transferred to disc.

Acorn User order form on page 130 – 24 hour telephone service (0672) 40825

OFFERS

PROGRAM LISTINGS



Solve your problems with the monthly listings

Have you been having problems finding one thing among millions on your database? Joe Telford has, and his Jottings for October compare several different ways of sorting databases efficiently and ordering them for easy use. Using his program you can arrange all names and addresses alphabetically without spending hours doing it by hand.

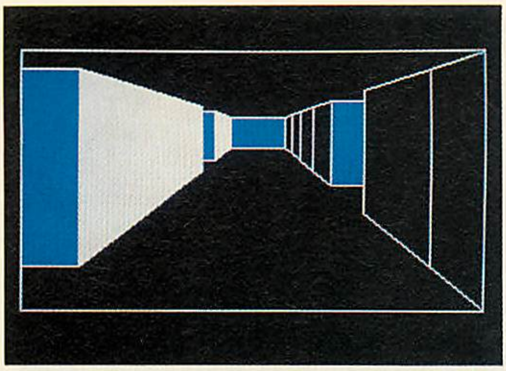
Based on the idea of writing programs to control the real world, our *Switch* program lets you practise programming a traffic light sequence. And you can use a modified version with an interface box to control real devices such as relays, buggies and robots.

Network users will be delighted by our 'cataloguer' program, which allows you to access your directories and files automatically, without the need for typing *commands.

Make certain that your text is printed as you want it with our printer driver generator for use with *View*. And also from Forum this month is a program that allows you to take the graphics from *Fleet Street Editor* and convert them for use with other graphics packages.

The monthly listings discs come in 40/80-track 5.25-inch format and are great value at only £5.95. All our monthly cassettes are for BBC and Electron users and contain a simple cassette to disc transfer program – a snip at £3.95. Don't forget all back issues of the cassettes and discs are still available too – see the order form on page 129.

LISTINGS

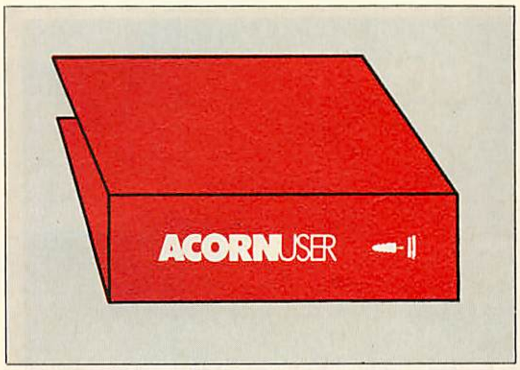


Monthly listings subscription special

Subscribing to the *Acorn User*'s monthly listings discs and cassettes will save you hours of typing and debugging the listings. For this issue only we are offering a subscription to our cassette listings for an unbeatable £35.00 – a saving of £10.00. Subscribers to the monthly listings discs will receive a free copy of *ViewChart* – worth £12.95 when they subscribe for the year.

The *Acorn User* monthly listings are great value, so be sure you receive the best programs, utilities and graphics and post your subscription today!

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Vastly reduced prices for disc binders

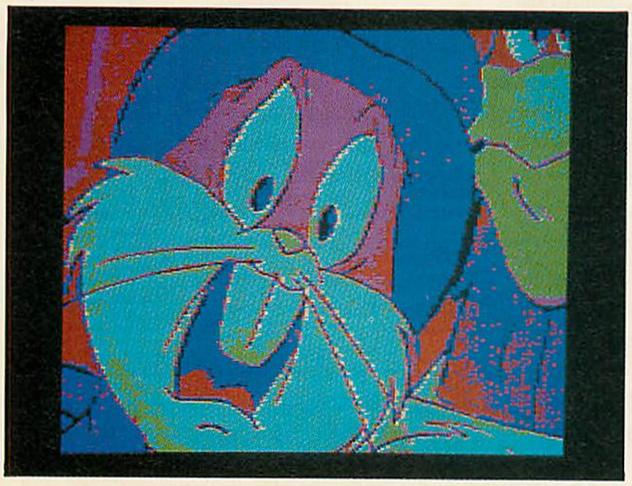
Our grey cloth disc binder is supplied with its own protective slip case and is filled with six transparent inserts, which will hold a year's supply of 5.25-inch monthly discs, and it is currently available at the special price of just £6.95.

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OFFERS

GALLERY DISCS



Gorgeous screens with our Gallery discs

BBC/B/ B+/M/ C *Acorn User*'s *Gallery* and *Gallery Collection* discs are now in 3.5-inch format for Master Compact users. Each disc is a giveaway at only £6.95, the same price for all formats. Both discs have over 20 brilliantly digitised and stunningly produced screens that will automatically scroll for your amusement, or you can load them all individually to have a longer look.

The screens on the *Gallery* disc include some old favourities, such as Thomas the Tank Engine, as well as some new ones that will amaze, tantalise and entertain you.

The *Gallery* disc also has *Super Painter* and *Pixel Editor*, so you can do the creating. These two programs can be used in conjunction with the screens we give you to alter and improve them, or you can create totally new graphics screens of your own.

The rich and the famous, or sometimes infamous, put in an appearance. Tony Hancock is on the *Gallery* disc, as is Max Headroom. On the *Gallery Collection* disc, *Spitting Image* and the *Dallas* crowd are in vivid colour in the company of Henry VIII, and everyone's favourite, Bugs Bunny.

All the screens on the *Gallery Collection* disc come in compressed form with a program to help you compress and expand your own screens, so saving valuable space.

Whether you choose 3.5-inch or 80-track or 40-track 5.25-inch format, you'll be getting great entertainment value.

DISCS

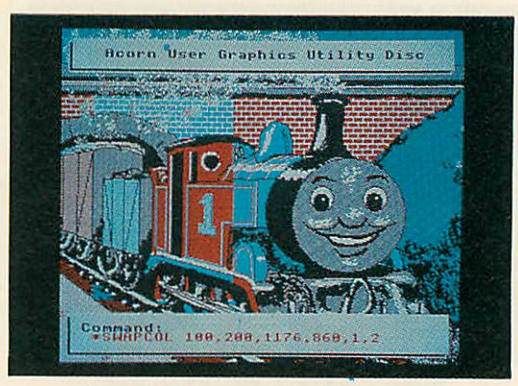


Disc for all sideways RAM users

BBC/B/ B+/M/ C The *Sideways RAM Utilities* disc includes: *Ram-Pad* – your computer's answer to the pad and pen. *On-Screen Fonts* – a variety of print styles available in all graphics modes. * HLP ROM – add your own help text to call up when you're stuck. Standard ROM header for use when writing your own ROMs. * RLOOK to examine the contents of your ROMs and sideways RAM images.

There are many more utilities on this 40-track 5.25-inch disc with a transfer program for 80-track users, and it's competitively priced at £9.95.

DISCS



Graphics utilities for your screens

BBC/B/ B+/M/ C The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 routines to manipulate blocks of graphics: rotation and reflection, a screen compressor/expander, a colour flood-fill routine and three mode conversion commands.

With the Basic procedure library are multi-height, proportional and justified text and 'drop shadow' boxes. A teletext screen editor gives point plotting, line drawing, rubber banding and flood fill, along with all mode 7 control codes. All can be used in your own programs.

***Acorn User* order form on page 130 – 24 hour telephone service (0672) 40825**

OFFERS

D U M P R O M S



Printer control with the UserDump ROM

BBC/B/ B+/M/ C/E

This pack includes the easy-to-fit *UserDump* ROM chip and a practical 22-page guide to the screen dump and printer control facilities offered – for just £19.95.

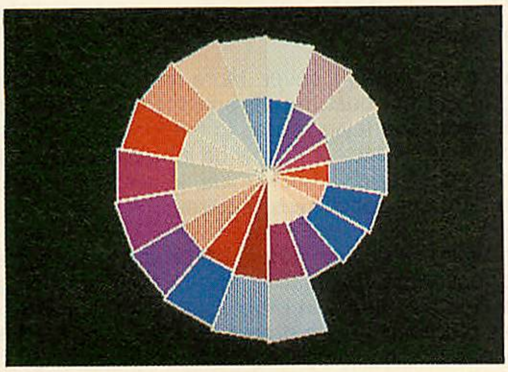
Once installed, *UserDump* will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing in direct from the keyboard. A perfect dump can also be obtained while a machine code program is running.

UserDump features the following extra commands: *WDUMP – dump of graphics window only in any mode; *ZDUMP – a distortion-free dump of the mode 0 screen using plotter graphics; *TRANSIT – translate teletext screen into mode 1; *SHIFT ‹argument› – shift any area of memory; *IBM – select IBM printer; *CP80 – select CP80 printer.

UserDump is compatible with the BBC micro (model B or B+) fitted with operating system 1.2. Any earlier version will cause problems. *UserDump* is fully compatible with the Acorn 6502 second processor. It works with any printer which has single density and double density bit image graphics, including all Epson (LX, RX and FX) printers, Star Gemini and Delta, SG, SD and SR, Canon and Kaga NLQ. Also usable are the Shinwa and other CP80 printers.

There are many more commands available with *UserDump*, and details are available from Seran, Redwood Publishing Ltd., 141-143 Drury Lane, London WC2B 5TF.

R O M S



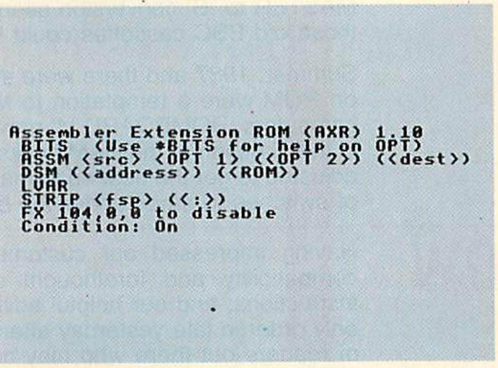
Your favourite Acorn User routines

BBC/B/ B+/M/ C/E

Get *UserROM* for your favourite *Acorn User* routines. Plug in the ROM chip and 19 routines are instantly accessible via star commands, including colfill with 27 colourful fills; dotfill providing 23 new black and white shades; bad program recovery; variable lister; function key lister; a graphics compiler; a circle drawing routine and a sound compiler. There are many demonstration programs and a 22 page manual. All for £19.95.

Full details are available from Seran, Redwood Publishing Ltd., 141-143 Drury Lane, London WC2B 5TF.

R O M S



Acorn User Assembler Extension ROM

BBC/B/ B+/M

The *AXR* ROM, competitively priced at £19.95, is especially designed for use by machine code programmers. *AXR* adds a variety of options and commands to the Basic assembler, along with several new pseudo op codes, full Basic expression evaluation, and even the use of binary numbers. A disassembler is included in the software, and all 65C02 instructions can be used. *AXR* is compatible with Basic 1, 2 and Master.

Further details from Seran, Redwood Publishing Ltd., 141-143 Drury Lane, London WC2B 5TF.

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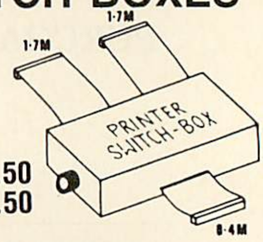
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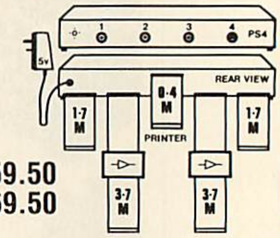
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Access

Back to school special edition

This month's edition of *Acorn User* is a back-to-school special. As well as these education news pages, several of our feature articles are of relevance to school computer users. Articles of particular interest to educationalists include:

Teaching with a cheese sandwich

Home economics teachers will find a wealth of materials in Academic Software's range.

In the home economics area, and perhaps of use in biology, *Digestion* follows the route of a cheese sandwich through the digestive tract, studying the enzymes that break down the food and the nutrients that come from it. In addition there is the *Compleat Meal Planner* (£31.95) which provides for studying the practicalities of menu planning and contains much nutritional data.

Kitchen Planner in 3D (£21.95) has been recently modified and updated. This package allows the design of kitchen plans which take into account ergonomic considerations. Simple costings are also linked to the planning element.

Speaking out for the disabled

An exciting new development in microelectronic aids for the disabled is the My Voice speech synthesiser from Elfin Systems.

The device contains sufficient RAM chips to store the digitised data for up to 60 two-second phrases or 120 one-second phrases. These are stored using a microphone unit which plugs into the back.

The phrases are retrieved by means of a set of keys, located under a perspex grid which aids the disabled user. Pressing the correct combination of keys elicits the required spoken phrase from a loudspeaker.

The system is totally portable, running from rechargeable batteries strong enough to maintain continuous speech for several hours after an overnight charge. The most common communications aid for the severely disabled, as specified in DHSS guidelines has been an electronic typewriter – not something that can generally be used from a wheelchair when out and about. If the disabled person already uses a PC for other purposes then the machine may be driven directly from that computer.

Also a scanning keyboard for the severely disabled may be operated by the 'one switch' and 'two switch' systems – by depressing the switch when the appropriate light under the keyboard illuminates as the sequence scans over the keys.



My Voice speech synthesiser, displayed by Elfin's MD, Steve Martin

For the BBC micro user, the My Voice unit will have an optional Concept Keyboard interface, and may be used to provide speech for activities which might need it, perhaps for a visually disabled person.

The quality of the speech is excellent because of its digital origin, and extension of the memory capacity to increase storage by up to four times will be provided. The package costs £950 excluding VAT.

Compact Supastore

ESM has released a Compact version of its *Supastore* database management system. This version keeps all the utilities and user databases on the same 3.5-inch disc. The file structure is much the same as for the Econet version.

Supastore's simple operation makes it attractive for many educational establishments. Because it is so flexible it is also useful in the office or library. *Supastore* costs £37.50.

Siege software

Castle Under Attack is a medieval - age, strategy game from Fernleaf suitable for students from nine to 14.

Two sides work out strategies for attacking or defending the castle. Simple war-gaming principles are used, and strategies based on historical facts gleaned from a booklet provided with the package.

Authentic medieval weapons such as mangonels, seige towers and rams are employed. Two versions are provided varying in length and complexity. As the game may be long, there is a save facility which enables games to be stopped part way through and restarted.

The package is not intended to teach history – it's really problem solving in a more directed fashion.

The intention is for groups of children to co-operate to plan the best strategy and then adapt it later. Fernleaf points out that there is no attempt to simulate a real battle and, despite the machinery of war, no one in the program is killed.

The package is available for all BBC machines and further sets of 10 players' information books may be bought from Fernleaf for £4.95.

Publishing package for wide range of ages

Sherston Software's latest venture, *Typesetter*, is a desktop publishing package likely to appeal across a wide range of ages. It's simple and it may be run on any number of machines using the system disc.

The package does not include any graphics facilities. It is aimed at producing textual output, leaving boxes for illustrations. Three type styles can be used, the printer's character set and two headline fonts.

Typesetter minimises problems caused by constant disc-swapping, overlaying of page sections and importing of font files by reducing disc access.

It allows the user to create boxes into which text may be typed which 'bounces off' the walls and may be word-processed. The options are controlled through pop-up menus, so the package can be driven by younger children.


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Make headlines with *Typesetter*

This package bridges the gulf between simple text handling packages like *Front Page Extra* and the more complex software such as *Fleet Street Editor* and *AMX Stop Press*.

To accompany *Typesetter*, Sherston has brought out an adventure, *The Fleet Street Phantom*. By solving a number of language problems children work their way up from junior reporter and are rewarded by being made editor!

Typesetter is available on 28 days approval at £31.65. *Fleet Street Phantom* costs £15.

Could do better

Combining the use of software with TV programmes and other media is too much for many teachers, says an Independent Broadcast Authority report.

The report, called *Interfacing Broadcast Educational Television and Computer Software*, is based on the use of two packages linked to two TV series, *How We Used to Live* and *Junior Maths*.

It casts doubt on the perceived quality of software in general and describes the specific packs as not being up to the standards of the programmes. However, software is seen as getting better, and the area of multi-media education is so new that the skills of the developers – and the teachers – are just evolving.

The interfacing is described as 'not totally successful' because of inadequacies of the software, the novelty of the enterprise, and the scale of what the teachers have to do.

Other factors were a 'culture gap' between the way adults and children perceive television and the fact that pupils treated software as a game. Also, an assumption that computers were readily available on the part of the software makers showed they might be remote from classroom realities.

Details are available from Christopher Jones at the IBA.

■ Another report, on micros in US higher education, estimates there is one machine per 17 students, but personal ownership boosts this to one for every five. Copies cost $125 for institutions and $1195 to companies from Peat Marwick in New York.

Handbook for language teachers

Using Computers in the Language Classroom by Christopher Jones and Sue Fortescue, (published by Longman at £6.95), is written for modern languages teachers hoping to use micros in the classroom.

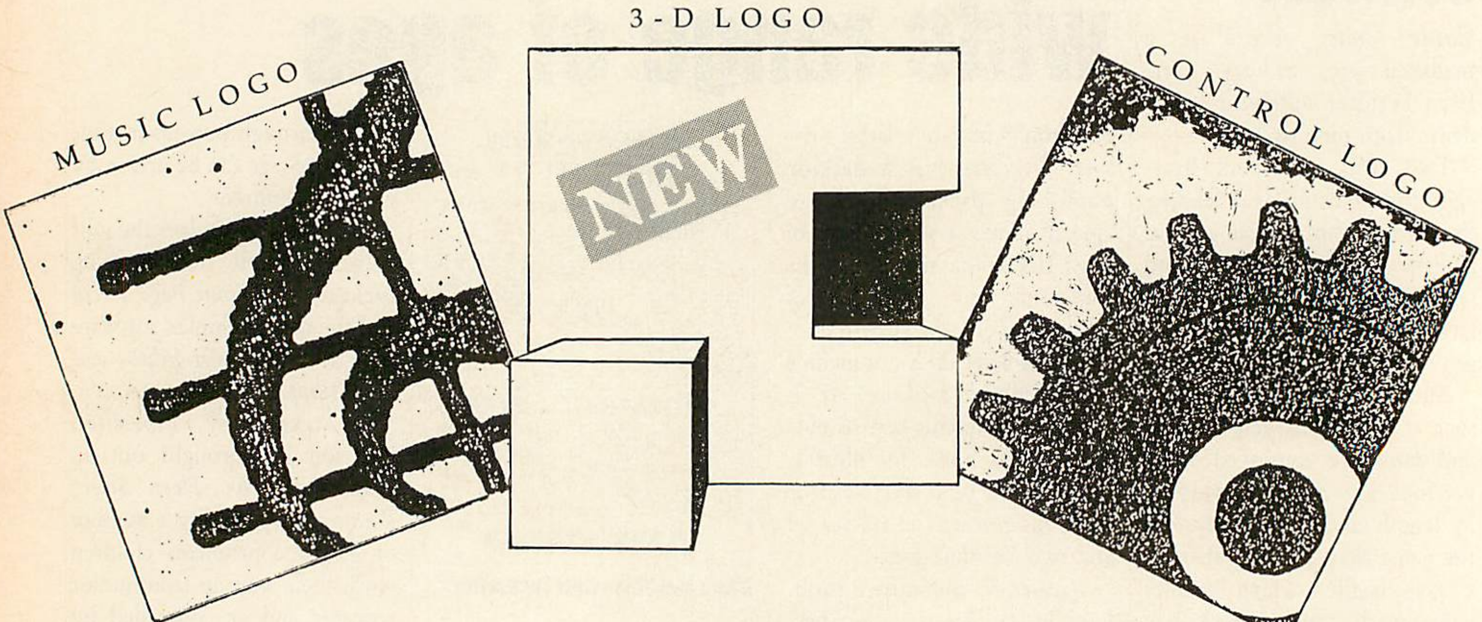
Most linguists are not taking the computer seriously. As the book points out, the word-processor is an enormous aid to language development.

The authors concentrate on two sections – the first dealing with the things a computer can do, covering software's relationship to the language curriculum. The book's second section is practical, about hardware and software choice, classroom organisation and management. It is obtainable from Wida Software.

Contacts

Academic Software, Sourby Old Farm, Timble, Otley LS21 2PW. Tel: (0943) 88628.
Elfin Systems, Byard Road, Gloucester G12 6DS. Tel: (0452) 411533.
ESM, 32 Bridge Street, Cambridge CB2 1UJ. Tel: (0223) 65445.
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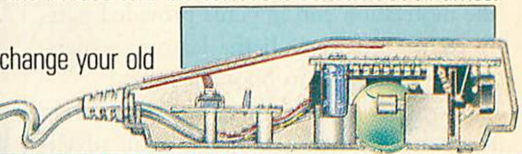


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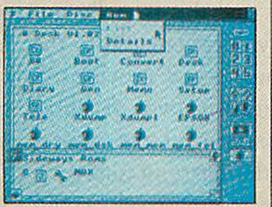
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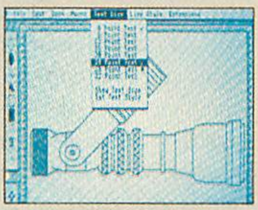
MAX provides an easy to use graphic based front end to your computer's disc filing system including a comprehensive set of disc management operations such as cataloging, copying, deleting and re-naming. You can also run programs from within MAX. Available for the BBC, B+, Master 128 and Master Compact. Please state which version is required.



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THE SWORD IN THE SOFTWARE

Using computers as part of a wider project is all very well in theory, but how does it work out in practice?

Chris Drage and Nick Evans



The package's Arthur does battle with the children's collage knight

Last month we looked at the recent software releases which fall into the broad category of educational adventure programs. Many teachers new to, or shy of, computers frequently under-estimate the power of software to motivate children. With properly planned and soundly organised work, children can be successfully led into the rich imaginary world we discussed last month. Perhaps those that doubt the validity of classroom adventure programs see children as 'having fun' at the expense of skill and concept development.

This is not so. In the hands of the skilled teacher an enormous amount of learning can take place away from the micro with the motivation and impetus provided partly by the software. If the learning experience is enjoyable to boot then great!

To underline this, we will describe in some detail the incorporation of an adventure package in the classroom.

The Arthur Project concerns itself with the life and times of King Arthur and his knights of the Round Table. The Dark Ages era of Britain's history is much celebrated in legend and literature, but there are few facts and fewer contemporary sources. Teachers generally have problems finding resources and materials suitable for use in school. The *Arthur Project* pack is an assembly of multi-media materials which aims to present the Arthurian myths and legends in a proper historical context. The pack comprises a disc-based adventure program: *The Quest for the Holy Grail*, two stories on cassette, 20 transparencies with a taped commentary, eight project cards and four copy sheets. *Arthur* offers a complete set of pre-packaged activities which can be used immediately by any teacher. What is important about this package is the range of approaches, levels of understanding and teaching styles possible. But how is it received by a class of 30 nine-year-olds? Can the Dark Ages be 'lightened' by the *Arthur Project*?

On studying the pack and planning a strategy for its use with the class, it became apparent that the range of resources would need to be widened. Books were collected from local libraries, and a visit to a farrier arranged, so the class could gain some practical experience to support the project.

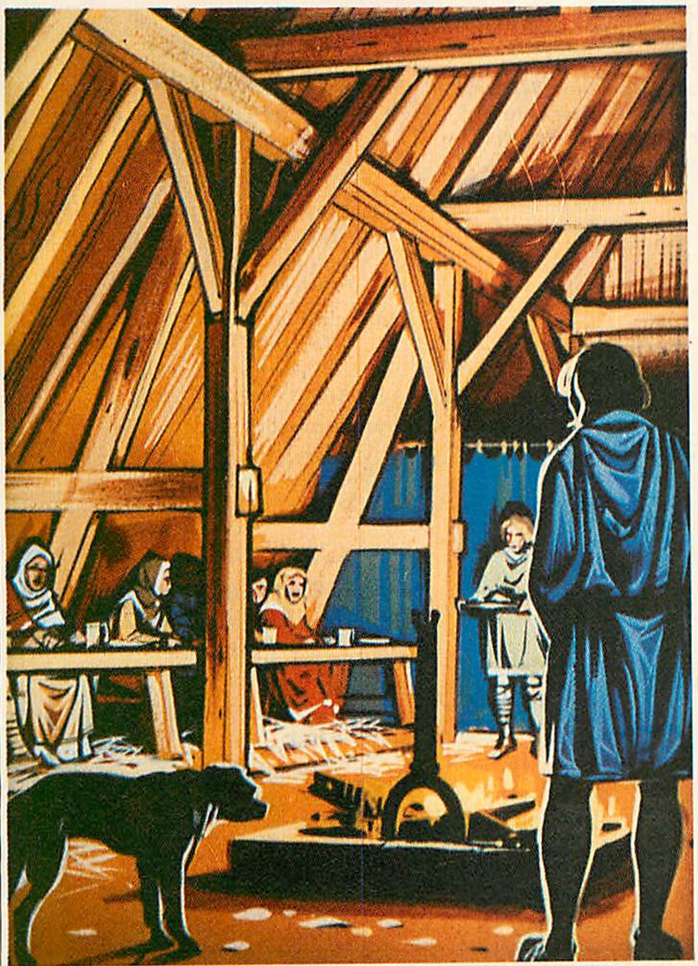
As this class had already studied life in Norman England, and had visited a Norman castle, they had some background knowledge of medieval life which would help them understand life in the Dark Ages. To provide further information and imagery, non-fiction titles about Celtic and Saxon life were obtained. The teacher's manual to *The Arthur Project* lists a bibliography of over 20 books.

Only one copy of each project sheet is provided in the pack and this is really not enough. After a hasty telephone call to the publisher extra copies were provided – enough for one between two or three children. A quick preview of the project sheets which form the heart of the pack also revealed that the reading levels would prove difficult for about a quarter of the class. For those children who struggle with reading, the teacher should read each project sheet and discuss it with them in some detail. The four copy sheets were reproduced, an inviting wall display created, and the scene was then set.

The theme was introduced to the children by the sharing of a rousing Arthurian legend read aloud by the teacher. Further background information was provided by the transparencies and taped commentary. This audio-visual presentation gave the opportunity for a good deal of discussion and provided additional motivation. The adventure program takes the form of an Arthurian legend *The Quest for the Holy Grail*. Success in this adventure depends not only on solving problems, but also on choosing the correct knight supporter at the right location, a choice based on each knight's attributes. The adventure was planned to be used as a springboard for creative writing, drama, art and craft.

Classroom organisation is always a major headache – hardly helped by the fact that there is often only one micro available. The software was introduced as a whole class lesson to ensure all the children were familiar with its aims and mechanics. This is an important step which should never be overlooked when planning software use.

They were then divided into working groups – by working in threes or fours computer time is maximised, and children can draw on a larger fund of ideas. The personalities of the children in each group play a vital role with this type of software.







Slides like these help to put the adventure in its historical context

Each group was given a set amount of time with the program while the rest of the class tackled related activities arising from the project sheet. This strategy proved very successful – children recorded their decisions and moves in the adventure so that positions could be quickly returned to. The teacher's role here is to encourage children to discuss strategies and not to accept defeat, but to try a variety of ploys. The children elected to record all their work on large charts which most wanted to compile into books or 'scrolls'. With the children engaged in so much related work, the teacher's role was chiefly an advisory one involving checking, correcting and encouraging those children experiencing some difficulties.

As the project progressed, class lessons in art and craft, and in written expression, arose from listening to the dramatised legends provided on the audio tape. Collages and paintings were soon in abundance, and one child constructed a model of a Celtic boat. Stories were written on the computer using the *Pendown* wordprocessor from Logotron. Here children really appreciated the range of fonts available. Particularly popular was the 'Oldeng' font provided on the Toolbox disc. The satisfaction of having their stories printed in Old English script resulted in an excessive demand on the classroom micro. A second machine had to be co-opted from another classroom to enable the adventure to continue at the same times as the wordprocessor was being used.

Another interesting use of the computer in this topic arose from using *Pendown's* Toolbox. This disc contains a real gem of a program, *Sign Writer*. It enables large text to be output from the printer in a range of fonts. It didn't take the children long to realise that a variety of headings could be made for their project books and scrolls. When these were cut out, pasted and coloured in, the results were attractive. The children were approaching the micro as a tool to fulfil an immediate requirement. The foundations of desktop publishing were being laid too.

As the weeks passed, groups successfully completed the adventure, slowly at first, then with a quickening momentum. It was amazing the numbers of successful children who wanted to try again!

In total, the project took seven weeks to complete. During this time murals depicting scenes from the legends were painted; pottery 'Holy Grails' were designed, modelled and painted; and butter was made in a jar with all the children taking turns to shake the cream – part of project sheet five. One group of children even wished to act out an Arthurian story. Almost all the children agreed the experience had been worthwhile and the visit to the farrier was the highlight of the project.

If an integrated approach to learning is best for primary school children, then computer software should reflect the same philosophy. It wasn't an accident that the adventure program in *The Arthur Project* took its place among a number of other equally important activities. *Arthur* satisfied the criteria for a successful educational adventure that we described in our article last month – it is original, encourages group work and work away from the computer, and is relevant to a wide range of subjects across the curriculum.

Arthur *is available from Rickitt Educational Media, Ilton, Ilminster, Somerset TA19 9HS and Nene Valley Publishing, PO Box 49, Spalding, Lincs PE11 1NZ.*

Price £34.44 (disc) or £36.74 (Master Compact) including VAT.

SOFTWARE

YOUR OWN VIEWDATA SYSTEM

KIDS, from Starters Software, lets you set up your own local teletext database. Manek Dubash investigates

Viewdata is becoming a fashionable medium for electronic publishing, and it's not just confined to large on-line databases like Prestel. Local systems, running on a single micro or a network rather than being accessed over the phone, have been discovered by schools and colleges as a simple but effective way of creating a high-tech local 'magazine'.

Now Starters Software offers a local viewdata database aimed specifically at schools and colleges. It describes KIDS (Kinetic Information Display System) as a real stand-alone videotext system for education. KIDS costs £39.95, or £78.95 complete with a numeric keypad. A teletext screen editor is available as an extra.

The screens look similar to broadcast teletext but are hierarchically linked, giving far greater capacity. KIDS can provide, for example, an electronic notice board or magazine limited only by the BBC micro's disc drive and mode 7 text and graphics. Being local, KIDS avoids expenses like modems and phone charges, and gives teachers direct control over the material. It also introduces another element with animated frames.

The package consists of the manual, a ROM chip, two discs containing utilities and a sample database to demonstrate the system and give you something to play around with.

The minimum hardware required is a BBC micro with Basic 2 and a single-sided 40-track disc drive. If that's all you have you can get around 110 frames in your database. Two drives at double density give about 1880 frames, while the more normal configuration of two double-sided, single-density drives has room for some 1110 frames. Even so, I had to do a good deal of disc swapping, so for ease of use and reasonable capacity, dual drives are almost essential. KIDS compresses its frames, using on average of only three disc sectors each, increasing disc capacity by up to 25 per cent.

The program appears not to be sensitive to non-standard disc filing systems – I used Solidisk's and Watford's without problems



KIDS is an educational database

– but because KIDS directly manipulates the disc files the package will not work with ADFS. The utilities won't work with shadow RAM, but the database, once set up, isn't fussy in this respect.

The manual covers booting up the KIDS database, using the utilities and some technical information. Step-by-step instructions guide new users through setting up while stressing the importance of planning a database carefully – good advice irrespective of the system you're using.

My only gripe is its lack of information about the database structures used by KIDS, so experimentation with the sample material will not be a waste of time.

The manual also tends to mention 'carousels' with little explanation and has no filing system compatibility information.

The software compensates for the manual's deficiencies; it is menu driven and users are fully prompted. Mistakes are well catered for – I found that could not fool it with a rogue keypress – and it's usually possible to change your mind half-way through an operation.

After inserting the ROM, booting up the utilities disc brings up the front menu display. The 'set up' option is highlighted until the system is installed – a nice touch. Most of the other options are best left until the user has become more familiar with how the system works.

Setting up is a once-only job and is simply a matter of following the prompts. The settings are automatically saved to the utility disc and need be altered only if the hardware changes. KIDS takes 10 minutes to initialises the database discs by creating an index and files to contain the frames.

The next step is to map out the database and create the frames. KIDS creates animated or static frames. The animator stores each movement around the frame which, when displayed, repeats the movements made in drawing it. The delay between each movement is user definable. For static frames, I found it easier to use a teletext editor but pages can be from any source.

All that remains is to slot the frames into place, following self-explanatory prompts, but remembering that certain frames have special functions. For example, keying *90 means 'quit' so frame 90 must say goodbye! And carousel frames – displayed if KIDS is left alone for a while – are always pages 251-259. If a Solidisk real-time clock is fitted, the time and date will be shown.

Other menu options are concerned with database management, such as viewing log frames and frame links. Log frames record the popularity of each frame, allowing the database manager to respond to demand. Linking frames is simple, provided the database has been fully planned, and involves anticipating and routing every possible keypress.

An individual or institution with a large collection of teletext frames could find a use for KIDS. It is powerful, offering animated mode 7 screens, efficient frame storage, full user control and a potentially complex structure.

But not every school will have the expertise on tap to exploit KIDS' full potential: one teacher told me he felt schools would need someone fairly knowledgeable to set up and maintain the system, but careful examination of the sample database could pay dividends here. Finally, in the manual and the sample database some misspellings crept through the net – not recommended in an educational package! With those few caveats, I have little hesitation in recommending KIDS as a thorough and exciting piece of software.

KIDS is available from Starters Software, PO Box 4, Brecon, Powys LD3 7JS.

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'ARTROOM...the best there is.'—Acorn User Feb '87

'ARTROOM is the software for you.' A & B Jan '87

ACE consists of two programs. COLOURIZER enables you to produce MODE 1 colour versions of ARTROOM screens and to dump them to a printer using a shaded printer dump. The MODE CONVERTER program will convert any graphics screen into a Mode 4 ARTROOM screen ready for loading into ARTROOM. Conversions can be made from Modes 0,1,2,5 and 7, yes SEVEN!

'...very pleased with the way Clares have introduced the colour facility.' A & B June '87.

ARTROOM and ACE will work with any mouse but we recommend DIGIMOUSE because it is well engineered using a non-slip ball and optical encoders. DIGIMOUSE also includes the unique 'LINEAR LOCK' facility that enables you to draw straight lines freehand.

'...impressed by Nidd Valley Digimouse' A & B June '87

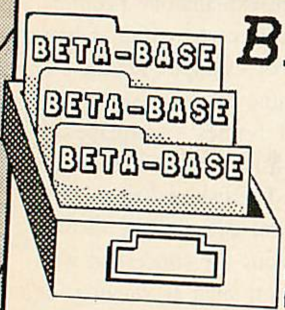
This complete package is marketed by Olivetti in Italy, the home of style and design.

ACE A STROKE OF GENIUS!



DIGIMOUSE

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The Beta-Base pack consists of Beta-Base, the number one database for the BBC micro, and Beta-Base Utilities which extends the power of Beta-Base.

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'We use Beta-Base ourselves' Mike Bibby, Editor of MICRO USER.

'Rated best value for money'—ACORN USER Dec '84

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N.B. If ordering for a Master or Compact please state DFS or ADFS. The ARTROOM pack is for the Master or Compact only but all other software is available for all machines.

RAMROD





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The UTILITIES PACK consists of RAMROD and MACROM. RAMROD is the ultimate toolkit ROM and it is compatible with the whole BBC range and includes a disassembler plus editors for DFS, ADFS, RFS, memory, Shadow memory, Sideways RAM, Tube plus lots more. RAMROD will take you to the furthest reaches of your machine and enable you to boldly go where no ROM has gone before!

'an ingenious collection of utilities...' BEEBUG Oct '86

'worth its weight in gold.' A & B Jan '87

MACROM is a fast full featured MACRO ASSEMBLER that allows the use of macros, which are loaded from disc. MACROM has its own easy to use editor which automatically formats your source code. A HI version of MACROM is supplied for use with the second processor. A macro library and demonstrations are also supplied.

'Full marks for an excellent product.'—BEEBUG JUNE 1986

We are also making BROM+ available under this offer. Its main feature is the full scrolling BASIC editor which allows the user to edit a program as if dealing with text in a wordprocessor. There are many other features dedicated to making life easier for BASIC programmers.

'This is the best BASIC screen editor I have so far used.' —MICRO USER August 85

For BROM+ add £25 on ROM, £20 for 5.25 inch disc or £22 for 3.5 inch disc.

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The FONTWISE+ pack contains FONTWISE+, the FONT EDITOR and 22 fonts. FONTWISE+ enables you to print very high quality text in a choice of 22 different fonts and 3 sizes. You do not need a special printer, just an EPSON RX or FX compatible. High quality is not the end of the story because you can also have both proportional and justified text. The output has to be seen to be believed.

FONTWISE+ is compatible with WORDWISE, VIEW, INTERWORD, MINI OFFICE II and EDWORD II.

'FONTWISE is better than many NLQ packages'—ACORN USER Sept '86

The FONT EDITOR is very easy to use and allows you to edit the current fonts or create new ones. Reviewers have praised the editor for its ease of use and faultless presentation.

'editor is impressively quick, smooth and easy to use'—A & B

EDITOR '...puts all previous designers to shame.'—BEEBUG July '86

Ask for a sample printout.

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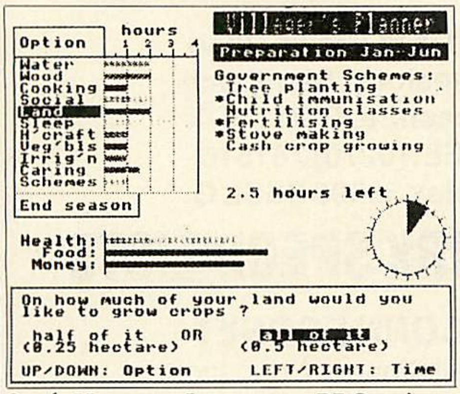
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EDUCATION

SOFTWARE

STRANDED IN THE SAHARA



Sand Harvest; Longman; BBC micro; £28.75 (disc).

Enter the simulated world of *Sand Harvest* and you take on the role of either a Tuareg nomad, a Songhai villager, or a government officer. You must battle against the encroaching Sahara while struggling to keep your animals fed and watered, grow sufficient food to feed the townspeople as well as your own community, and raise cash to pay the tax man. Success requires careful planning, and thoughtful decision making.

The actions of the characters are interrelated with natural conditions and world forces to determine the effect on desertification, the fate of crops, trees and water supplies; population, life expectancy and wealth; and to discover the success of government schemes.

At the end of every year there is a report giving details of how all the variables have changed, comparing maps of the region before and after, and an explanation of what has happened. The software manages to present a lot of information in an understandable way. Annual reports can be printed for future reference.

The flexibility of the program is increased by the facility to change just about any variable influencing events, from the state of the exchange market to the level of annual rainfall.

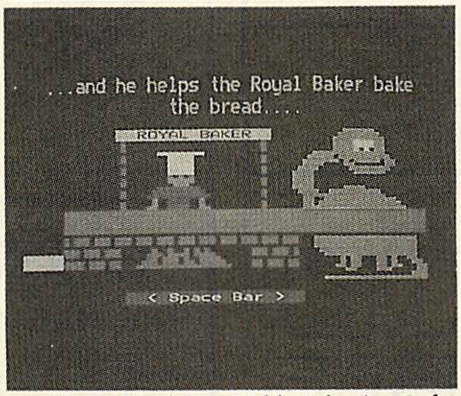
Set-ups can be saved on disc and returned to later. A simple set-up is available at first enabling a feel for the simulation to be established quickly.

The program comes with a wealth of well-produced material – handbooks for the nomads, villagers and government officers as well as the organiser, with the relevant parts being freely photocopiable, and a wall chart with background information on Mali. The booklets are crammed with detailed local facts and provide a resource to make the simulation meaningful and captivating. Also included are many hints about introducing the program into the classroom and managing its use.

This package is a very valuable tool in the hands of the educationalist striving to encourage awareness of the world community. My only fear is that if it is used superficially by people used to switch on and go software, it will be wasted: *Sand Harvest* deserves better than that.

Stephen Cole

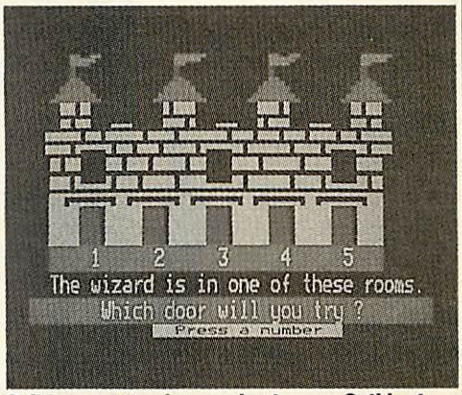
CAN YOU CURE CUTHBERT?



Cuthbert Catches a Cold; Selective Software; BBC Micro, Master series; £22.94.

Dinosaurs are always a popular subject with younger children and so you should have no trouble interesting them in this program from Selective Software.

The story revolves around Cuthbert – a green and cuddly brontosaurus. Cuthbert has caught a cold; to cure him it is necessary to find some magic fruit. The three parts of the adventure each require different skills. The first part is to find the wizard who will help you in your quest. You then visit Rhymeland and finally go to Playland to meet the Queen of Hearts. As well as the adventure disc there is a disc containing two cartoon stories and a selection of tunes. The story disc was impressive – Selective has used *Movie Maker* for the graphics and the result is excellent. The package comes with a storybook and a teacher's manual with suggestions for follow up activities. There are activity cards and Concept Keyboard overlays for use in the classroom — a comprehensive package.



Children must solve puzzles to cure Cuthbert

One problem in many primary schools is the lack of contact time, but *Cuthbert* has lots of suggestions for activities that can be done away from the computer. This is an excellent program. Congratulations, Selective, on a well thought out, very professionally produced pack that will stimulate lots of back-up work.

Godfrey Hall

IN SEARCH OF A PRINCESS

Droom; HUMMEC; £15.95 (disc).

Droom is an excellent mathematical adventure from the Humberside Microelectronics in Education Centre. The story is about Henry the frog who is really a prince, and the task is to free the princess so that she can turn Henry back into a prince. The story book accompanying the program introduces the characters and sets the scene. To progress through the adventure the children must solve several mathematical problems and puzzles.

Children can work on one part of the program at a time or work through the whole adventure. Also teachers can link it to other activities, leading the children from maths into other areas of the curriculum. It is a very flexible program in that it need not be finished in one session – it is written in such a way that you can dip into it whenever you like. The accompanying booklet includes many activities to cover away from the computer, and a list of follow up ideas. A case study is also included to show how the program can be used with special needs children.

The supplementary disc includes several programs which can be used for follow up.

Godfrey Hall

THE NETWORK PAGE

Finding files on a network can be a problem. Here we present a directory menu to make things easier

Robin Newman

Most catalogue and menu selection programs available for the BBC micro do not meet the needs of an Econet installation, although because of the similarity between ADFS and ANFS, more recent ADFS menu programs are usable. This article describes a suitable program.

Before tackling such a program it's best first to list the things the program should do. I settled on:

- Displaying all the entries in a directory that you select.
- Displaying the *INFO details for each separate entry.
- Be able to LOAD, CHAIN, *LOAD or *RUN a selected file.
- Indicating whether the user has read access to the entry. If the user has insufficient access, then trying to access the file should not crash the program with an insufficient access error.
- It should be able to explore the directory tree structure, entering sub-directories and then climbing back up the tree to the starting point.
- The controls should be easy to operate, and the program should be compatible with Acorn level 2 and 3 and SJ file servers, as well as with all official versions of NFS and Basic.

It is desirable to hold all of the directory's information in memory at once, to cut out access to the file server each time a different file entry is examined. In the event, this is possible for Acorn file servers but not for SJ file servers for reasons that I shall describe.

Using the Osword &14 file server call, with a function code of 3, it is possible to glean all of the information about a file within the space of a 27-byte entry. With a maximum of 254 entries possible in the directory, this requires a data buffer of at least &1ACA; say &1B00 long. This means there is too little memory left to squeeze the program into and still work in a graphics mode. Only mode 7 gives enough space. In order to fit in up to 254 entries, the display has to be paged, with up to 45 entries displayed on each page. The cursor keys move a highlight bar around the entries on the page. Following or preceding pages can be accessed by trying to move the bar off the right-or left-hand sides of the screen.

Offset	Description
0	Doesn't matter
1 } 4 }	Four-byte address of data buffer F

After the call, the data buffer contains:

Offset	Description
0	Zero
1	Length of directory name
2 } LEN+1 }	Directory name as an ASCII string; no carriage return at end
LEN+2	Zero for owner access, 255 for public access

Figure 1. Parameter block to get access rights

Before call

Offset	Value	Description
0	0	Indicates file server call
1	18	Size of block
2	0	Reply port (filled in by NFS)
3	18	Function code (get file information)
4 } 6 }	0	Context handles filled in by NFS
7	5	Argument for call: get attributes
8 } 18 }		Filename terminated by Return

After call

Offset	Description
0	Zero
1	Size of block, &12
2	Command code: 0 if all is well
3	Return code: zero if all is well
4	Zero=not found: one=found a file: two=found a directory
5 } 8 }	Load address
9 } 12 }	Executive address
13 } 16 }	Size
17	Access byte
18 } 19 }	Date
20	Zero = user has owner access &FF = user has public access

Figure 2. Osword &14, function code 18

File and directory names are distinguished by colours. A separate area of the screen is used to display instructions and *INFO details for any highlighted filename. In addition there are four options, selected with the number keys 1 to 4, which enable the file to be LOADed, CHAINed, *LOADed or *RUN.

Determining the access to the file, owner or public, is difficult. The coded access string is available in the 27 bytes of information supplied by the file server. For Acorn file servers you can determine whether you have owner or public access to the directory by using one of the functions of the Osgbpb call in FNprivname, using the parameter block shown in figure 1.

For SJ file servers the procedure is more complex. SJ employs a storage space accounting system, whereby each directory and each file is allocated to one of 256 different user accounts numbered from 0 to &FF. Each user may be given ownership of any of these accounts, and it is this which determines whether the user is owner or not of a given file. So you can have owner access to a directory but only have public access to some of the files in it! All this is very confusing, but it allows the network manager to put in a directory files which are totally protected against being altered or deleted, and yet which can be freely used, while at the same time the user can add and delete other files to or from the same directory.

So, whenever a file is created on an SJ file server, it is marked with the account number of the person who created it. This file can be read, written to or modified only by people with the same account number! It is quite possible to have files in your 'own' directory that you cannot read, but other people can – if the file belongs to 'their' account.

In order to indicate the access that a user has to a specific file, SJ prints the relevant

access letters in upper case. For example, imagine a file called PROG with access string WR/WR. If it were allocated to an account owned by the user, then its access would become WR/wr. If an account were not owned by the user then its access would be wr/WR. This information can be gleaned from Osword &14 function 3, by using an expanded version of the call which prints out all the file information as a formatted string. But it would take an inordinate amount of memory to store the string for 243 files! An alternative file server call is employed by FNowner, which uses Osword &14 with function code 18. This call returns the catalogue information on a named file including a byte to indicate whether the user has owner or public access. The access byte is not returned like this on an Acorn level 2 file server. The parameter blocks used with the file server call are shown in figure 2.

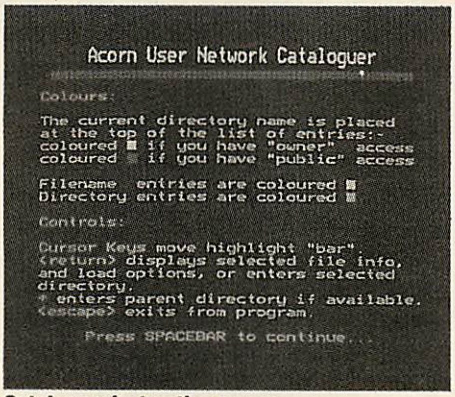
The procedures and functions used by the program are listed in the box on page 155. The three types are those involved with communicating with the network, those involved with processing the data received and those involved with displaying the information on the screen and making directory and file selections.

Looking first at the network procedures, PROCassm loads the file details into the machine. It uses calls to Osword &14 with function code 3 and argument 0 to return information on four files at a time as shown in figure 3.

Having fetched four entries, the machine code copies them from the parameter block to the data buffer, stacking entries end to end. The comments in the listing should enable you to follow how this works. The second section of machine code extracts information from the large data buffer by moving a pointer to the beginning of a given 27-byte entry, and copying the file/directory name found there into a string buffer used by FNname.

FNsj uses another file server call with function code 25. This returns a string giving the version number of the file server. All SJ file servers have the letters ST at the start of this string, and so it is a convenient way of determining whether the file server is one of the company's.

PROCod and PROCnd were originally written by SJ Research to whom thanks are due for permission to use them. They were first presented last October at the Econet Conference organised by ME Electronics of Reading. They enable you to switch between directories on the network, saving your original position and then switching back later on. This enables you to overcome several shortcomings of the Acorn level 3 file servers, for example the lack of *DIR ^ to enter a parent directory. The *DIR ^ command is on the new Filestore!



Cataloguer instruction screen

Before call

Offset	Description
0	Indicates file server call
1	Size of block, &12
2	Reply port (filled in by NFS)
3	Function code 3
4–6	Context handles filled in by NFS
7	Argument for call: zero means get all info
8	Entry point to directory, zero for first call
9	Number of entries to fetch
10	Directory name terminated by Return. Return alone fetches from current directory

After call

Offset	Description
0	
1	Size of block, &12
2	Command code: zero if all is well
3	Return code: zero if all is well
4	Number of entries examined
5	Directory cycle number
6–15	Entry name (padded with spaces)
16–19	Reload address
20–23	Execution address
24	P D L W R W R in bits 6-0 (P, SJ only)
25–26	Date last updated
27–29	System internal name (Acorn)
27	Main account no. (SJ)
28	Main/Aux. Acc. top four bits
29	Aux. Account no.
30–32	Size of file
33	27 bytes repeated for next file.

Figure 3. Osword &14, function code 3

Essentially, by saving the position, or context, of the directory you are in when you first run the program, a succession of *DIR commands can be used to move down the tree. To move up one level, the equivalent of *DIR ^, PROCod is used to return to the original directory, then all but one of the downward *DIR commands complete the job. This process seems quite complex, but it avoids having to climb above the starting directory by using the file's 'full' pathname, for example, $.Startdir.Subdir1.Subdir2.

The problem with using *DIR $.startdir.subdir1 on an Acorn file server is that because the directory is accessed through the main root directory, you get only public access to any files. Even if you are the owner of the directory, you lose owner access as soon as you use *DIR $.

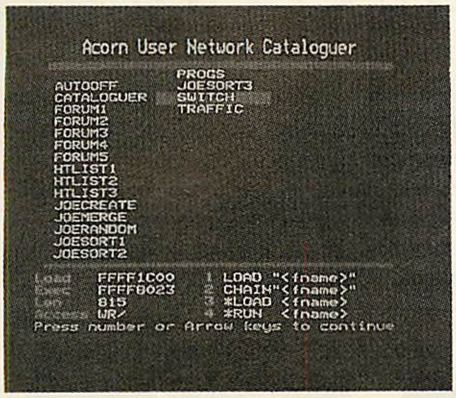
On an Acorn level 3 file server, there is a way of overcoming this problem. If your 'user root directory' – the one you start in when you log on with '*I AM' – is 'startdir', then '*DIR &.subdir1' has the same effect as '*DIR $.startdir.subdir1', but you don't lose owner access. In other words, $ indicates the main root directory and & your own main directory.

The *DIR command is missing from Acorn Level 3 file servers, but is present in SJ file servers and in ADFS. If you are in '$.startdir.subdir1' typing '*DIR ^' will take you back to '$.startdir'. This is simulated in PROCod by performing a '*DIR' and then a '*DIR startdir' to go back to the original directory and then enter the directory above subdir1.

You may also be interested in the network (and ADFS) *FIND utility published in September's Acorn Forum. This program searches the directory tree for a file and displays the full pathname of that file.

PROCaddr processes the loading information for a given entry from the data buffer. The access string data is the tricky bit – the access byte is taken from the data buffer and then the ownership of the entry is checked by FNowner. The variable ra% is set to TRUE if the user can read the file. FNas and FNtrib turn the access byte into the normal access string of letters eg, WR/WR.

The two central procedures in the third group are PROCdisplay and PROCselect. PROCselect checks that there are some



Cataloguer's net directory

PROCassm	Assembles code to get current catalogue details
PROCaddr(S%)	Extracts file address and access details
PROCdisplay(P%)	Displays 45 entries starting from entry number P%
PROCselect	Controls selection of an entry with the highlight bar
PROCscreen(D$)	Selects next or previous page of entries to display
PROCinit	Initialises various parameters, dimensions, arrays, etc
PROCtitle	Writes the main title
PROCintro	Writes introductory instructions page
PROCprint	Checks whether entry is a directory or file. For the latter, writes address info on the screen and selects LOAD, CHAIN, etc. For the former selects new directory
PROCoptions	Checks if user has read access. Prohibits loading if not
PROCnogo	Prints insufficient access message
PROCaccok	Read access OK, prints LOAD, CHAIN selections, etc
PROCclear	Clears bottom window on screen
PROCload	Inserts LOAD"fname" into input buffer
PROCchain	Inserts CHAIN"fname" into input buffer
PROCstload	Inserts *LO. fname into input buffer
PROCstrun	Inserts *RUN fname into input buffer
PROCinsert(A$)	Inserts A$ into input buffer
PROCexit	Final housekeeping before exiting from the program
PROCdir	Selects a new directory, saving entry point details so that highlight bar is correctly positioned following a subsequent command. Also maintains pathname to current entry
PROCupdir	'Climbs' up the tree to parent directory
PROCwait(T)	Waits for T seconds with 'wait' message on screen
PROCnd(N$)	Switches context handles for new pathname N$
PROCod	Returns to original directory and context handles
PROCdowndir(a$)	Used by PROCdir to enter a new directory
PROCinstructions	Displays instructions in window on screen
PROCs	Sounds a beep
PROCboxon	Selects bottom window
PROCboxoff	Selects main window
PROCerror	Deals with errors, and Escape exit from program
FNsj	TRUE if using SJ file server
FNname(S%)	Returns the name of directory entry S%, colour code indicates directory or file
FNas(ac%)	Returns the access string corresponding to ac%
FNatrib	Selects alternative access strings for SJ file servers
FNnewns(D$)	Allows highlight bar to cross page/column boundaries
FNkeyclear	Waits until all keys are released
FNnamestrip(entry)	Removes colour byte and trailing spaces from entry names
FNpathname	Returns pathname of current directory
FNopen($osc)	Opens and returns the handle for directory $osc
FNprivname	Returns name of current directory. Sets privilege variable.
FNowner(entry)	TRUE if owner access to entry

Procedures and functions used in the program

files in the current directory. If all is well, it selects the starting position for the highlight bar. This will highlight the first entry unless the last command was '^' (select parent directory), in which case it will be set to the position of the subdirectory within the parent.

The highlight bar is printed by positioning a black background teletext control character at the right-hand end of the bar, and then positioning a new background code just before the bar. The black background code can't be printed for the very last entry of each page, as it would cause the screen window to scroll. Instead, a black background character is placed by the window enlarging, printing the character in the required place, and then restoring the window to its normal size.

The main selection loop tests for the cursor keys, the Return key, and the '^' key. The cursor keys cause the value of ns% (the next entry to be highlighted) to be calculated. PROCscreen and FNnewns calculate this value, allowing for horizontal shifts to the next page of entries 'left' or 'right', and checking whether the maximum entry has been reached. PROCprint is selected by the return key. If the current entry is a directory, then PROCdir is called. Otherwise PROCprint prints the *INFO information on the screen and then offers the LOAD, CHAIN, *LOAD or *RUN options.

PROCdisplay modifies both the page number, and the number of the first entry to display if the previous command was an '^'. Next the name of the current directory is printed by FNprivname, using the appropriate colour. A check is also made to see if the directory is empty or not. If so, the parent directory (if any) is automatically reselected. Two nested FOR...NEXT loops are now used to display the entries in three columns. The variable end% can force an exit from these loops when the last entry in the directory is reached. FNname prints each entry in a colour depending on whether it is a file or a directory.

The display makes use of different colours to signify different types of entry and access. These are chosen so they show up on monochrome monitors. You can experiment with them by altering the colour allocations at the beginning.

The program will allow you to explore any directory which is further down the tree structure than your starting point. So if you wish to explore the whole of a disc, you must start with the root directory $ as your currently selected directory when you run the program. The maximum level of directory nesting is arbitrarily set to 30 – if you ever need to delve deeper, you can increase the DIM values of path$(30), S (30) and P(30).

May you have many happy hours searching for your files!

Turn to the yellow pages index on page 113 for details of the listings.

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REVIEWS

GAMES

THE GAMES PAGE

With the end of the cricket season, David Lawrence gives you the chance to keep in practice over the winter

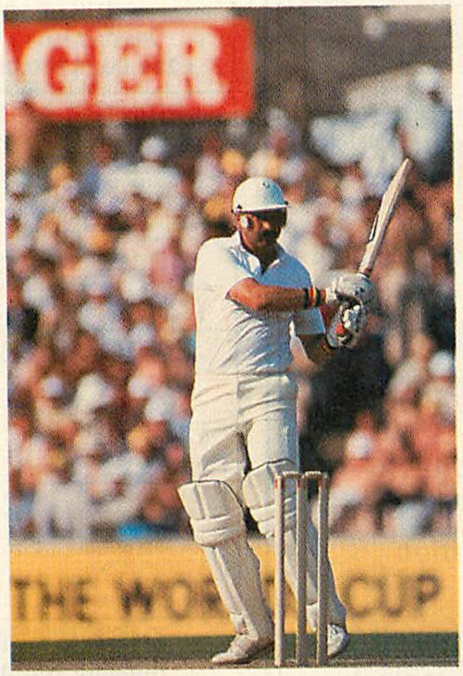
Phew, I'm glad the show's over for another year! Four days on the *Acorn User* stand is enough for anyone.

Superior Software was there showing off *Stryker's Run 2*, *Crazee Rider* and the latest version of the Arc game *Zarch*, which is an enhanced version of *Lander*. *Zarch* is still quite a long way from completion. Superior says that production copies should be available by the end of the year. So, until then, we're stuck with *Lander* in the office.

The Audiogenic mob, Peter Scott and Gary Partis, could be found propping up the bar. After a suitable bribe (a game of *Lander*) they showed me what they were working on. Peter is writing *Ransack*, a cross between his usual puzzle-solving games and *Defender*. The game features large sprites and fast action. Meanwhile, Gary is finishing off the BBC micro version of *Impact*, an *Arkanoid*-type game, but with a few special features and extra screens. He has also persuaded Audiogenic product manager Darryl Still to buy him an Arc, so that he can start on *Impact* for that. He is working on *Leader Board* too.

Tynesoft's BBC conversion of *Spy vs. Spy* is a very accurate copy of the original Commodore 64 game, and although it is quite hard to get the hang of, is actually a very addictive and enjoyable game. This is especially true when you play against a friend. The idea is to explore a secret base and find the documents, a key, some money and a passport and then escape! But your plans can easily be thwarted by the other player as they can set booby traps on doors, behind pictures or in filing cabinets. This game can ruin friendships!

Tynesoft also is to release another sports simulation. This one is going to be called *Indosports* and features four events, namely table tennis, airball, ten-pin bowling and darts. There are also plans for a *Commando*-type game called *Saigon*. Both of these are scheduled to be available by the end of October.



Win Graham Gooch's bat

PHOTOGRAPH BY ALLSPORT/ADRIAN MURRELL

According to Richard Hansen, Superior's plans include a game a month, at least until the end of the year. *Palace of Magic* – not *Castle of Magic* as mentioned last month – will be available in early September. *Palace* is really *Citadel* 2. It has lots of logical puzzles – for example, you must find the princess a present and give the vicar something. You must explore a forest, avoid the white rabbits and collect the magic hats. The layout of the game is very similar to *Citadel*, with over 100 graphically-detailed locations. *Palace* has been written by Martyn Howard, a newcomer to the BBC games scene.

It finally looks as though *Elixir* will also be released. This game has gone through three separate authors before eventually coming up to Superior's high standards. The final touches have come from Chris Hyde, one-time author of *Zany Kong* and *Zany Kong Jnr*.

Superior is also working on another couple of game compilations. But instead of just old Superior games, they will be 'games that should have sold better from other companies'. Nothing definite yet, but there are some pretty good games on Richard Hansen's shortlist.

Apart from David Braben, who's writing *Zarch*, we know that Jonathan Griffiths (*Snapper*, *Rocket Raid* and *JCB Judder* – his words not mine!) and Kevin Edwards (*Galaforce*) are both working on Archimedes games. And was it really an Archimedes playing *Gauntlet* at the show?

As the nights are drawing in and the sound of leather on willow is lost for the winter, we thought we'd have a competition to cheer up you disconsolate cricket fans. This is to coincide with the Audiogenic's release of *Graham Gooch's Test Cricket*. The prize is a cricket bat, specially signed by the man himself. All we want to know are the answers to the following simple questions:

- What is Graham Gooch's highest score in test cricket?
- What was the total number of runs scored by Graham Gooch in his very first test match?
- Graham Gooch has played for both Essex and England, but which other first-class team has he played for?
- Three other English players made their test debuts during the same Ashes series as Graham Gooch. Name two of them.
- Against which country did Graham Gooch score his maiden test match century, and where?

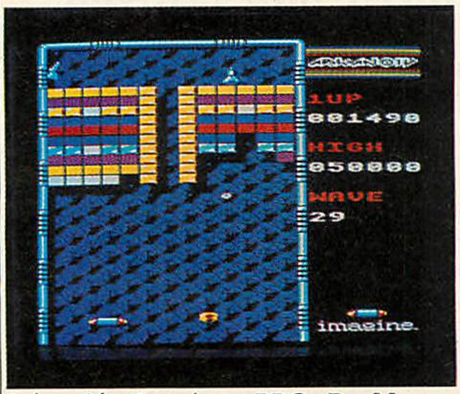
First correct answer out of the hat on November 12 wins the bat.

Send your answers to 'Graham Gooch Competition' *Acorn User*, Redwood Publishing Ltd, 141-143 Drury Lane, London WC2B 5TF. The editor's decision is final.

REVIEWS

GAMES

BREAKOUT IS BACK



Arkanoid; Imagine; BBC B, Master, Compact; £9.95 (cassette), £12.95 (disc).

Arkanoid is the old favourite *Breakout* brought bang up to date. You may have seen *Arkanoid* in the arcades – well, this is a near perfect conversion. As in *Breakout*, the idea is to bounce your ball (or energy bolt in this case) against the wall with your bat (they say it's a spacecraft) and knock out the bricks. This would be trivial if it were not for the descending aliens and the resilience of some bricks.

Aliens are destroyed if hit with a ball or bat, but divert your ball when it hits them.

There are eight colours of normal bricks plus silver and gold ones. Silver ones take two hits to destroy (more on later levels) while gold ones are indestructable!

The game starts off simply with a single straight wall of bricks but soon gets harder. The ball also speeds up alarmingly, making things very tricky.

Luckily, things aren't as nasty as they seem – some of the bricks when hit turn into capsules that drop down the screen. They take effect if you catch them, for instance the 'S' capsule slows the ball down and the 'C' lets you catch the ball.

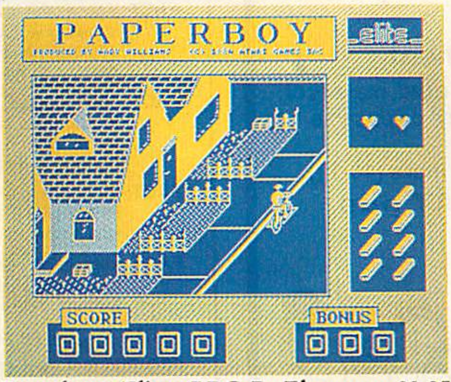
Graphically, the game is simple but good, although the score board could be improved. Stippled colours very effectively make up different shades for some of the bricks, and clever use is made of colour on the silver and gold bricks. The sound is also effectively used.

Points against the game are there is no sound-off key; the aliens often fly over the bricks; the ball often seems to go through the bat and there is no analogue control making rapid movements difficult.

Overall, the game is very addictive and well worth the money. It's especially nice seeing a BBC game using a full mode 2 screen with no colour changing!

David Lawrence

SACK THE PAPERBOY



Paperboy; Elite; BBC B, Electron; £9.95 (cassette), £14.95 (disc).

Paperboy is the computer version of the arcade hit, but not a very good one.

The idea of *Paperboy* is to cycle along the road and fling newspapers into mail boxes, while at the same time avoiding all manner of things including dogs, bouncing balls, old ladies, C5s, racing cars, gutters, graves and brick walls.

Your aim has to be quite good, and while you are sighting up, you tend not to notice the plant pot in front of you, or the C5 on collision course from a side-street; you don't have much time to think.

You gain bonus points for vandalising non-subscribers' houses with your papers. If you accidentally smash a subscriber's window, you lose all your bonuses.

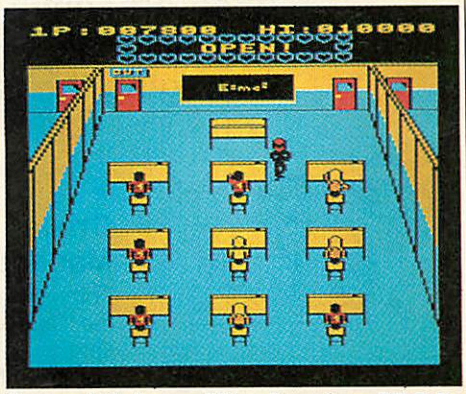
The 3D motion is very good, and Elite has overcome the problem of screen flickering very well. I'll give it originality marks for not giving a 'Game Over' message. Instead there's a newspaper with the headline: 'Get well soon paperboy!' Unfortunately half the screen is used up for your score and bonus marks.

At the end of each day's round, (if you complete it) you gain extra points by cycling round the track and making jumps over something totally unrecognisable.

The game is fun at first, but the more you play it, the more boring it becomes.

Sam Greenhill

IMAGINE ALL THE PROGRAMS



Konami Coin-op Hits; Imagine; BBC B; £9.99 (cassette).

In *Green Beret*, you are a 'highly trained combat machine', and your task is to rescue the captives held by the enemy. Your initial weapon is a knife, but by killing the Commandant, you collect other weapons, which you are advised to save until the end of the current stage, when you will be attacked by every enemy.

I have completed two stages, but haven't caught sight of the Commandant – only men who kick me in the face. It is hard to see yourself against the background, which makes fighting difficult. The scrolling is almost smooth, the sound effects reasonably realistic, but the game is quite dull.

The next game, *Mikie*, is a version of the arcade game in which you are the schoolboy collecting hearts in order to get a message to your girlfriend. It's an amusing game with simple, but reasonable, graphics. The keyboard is sometimes annoying, but *Mikie* is my favourite of the four.

Hyper Sports is another arcade follow-up, with *Chariots of Fire* as the loading tune. This is a very good game; the action is smooth, the graphics are good, and so is the sound, but after each event it has to load in the next one, which takes approximately five minutes. Then, if you fail that particular event, you are forced to rewind the tape and start all over again!

The last game is *Yie Ar Kung Fu*. This is good fun, and always seems to persuade me to have another go. You battle against 10 opponents, each with different abilities.

The whole package is good value, but there is room for improvement.

Sam Greenhill

SOFTWARE

UNDER STARTER'S ORDERS

And they're off! Michael Leete picks up some betting tips from DGA Software's *Pro-Punter*

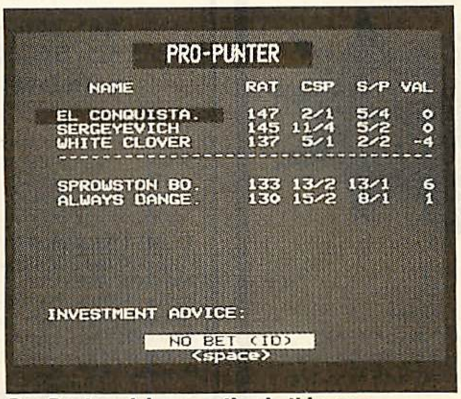
In its admittedly small field, *Pro-Punter* from DGA Software may well be a new front-runner. This horse race betting package is very well presented, with attractive screen displays and a concise and literate instruction manual. To the newcomer to racing, the program is considerably more helpful than the pages of *The Sporting Life*, which is one indispensable source of the required data. For example, the data is entered in five distinct stages. At the end of stage four, when both the user and *The Sporting Life* may be showing signs of wear and tear, a friendly message 'Nearly there . . .' appears on the screen.

Entering the data will take at least half an hour, so going through the race card is not really practical. The true skill lies in picking races, usually with only a few runners, in which analysis will be meaningful because the statistical information is abundant. After the input stages, the program will take several minutes to make its calculations – possibly as much as half an hour with a field as large as the Grand National – before listing up to 12 horses in their forecast order of finishing.

You then enter the starting prices for each horse, and the value of the odds offered on a scale ranging from 'Good Value' to 'Inflated' (a sure sign of a no-hoper) appear on screen. Finally, the program tells you whether to bet, giving coded reasons for the decision.

How the program processes the information and what weight it gives to each element is, of course, a secret, though the results suggest a far better system than sticking an electronic pin in the race card. At the time of writing, the program had forecast 34 winners in 43 races. Level £10 stakes (tax paid) on these forecasts would have netted a profit of £287.24 and the cash flow would have more than covered the cost of *Pro-Punter* after the first eight selections. Selections over a far longer period are claimed to have produced similarly profitable results. All this seems too good to be true, so let's examine the snags.

The first hurdle is cost – £57.50. In racing terms, such a sum would purchase about two-thirds of a pair of race-going brogues or five £10 bets in a betting shop and a fish and chip supper. It also represents the fee for about a dozen selections from a professional tipster. Therefore, viewed as the initial investment in a profitable enterprise, the cost does not seem excessive and as *Pro-Punter* processes new information for every race, there is no reason why it should not serve as an 'adviser' indefinitely. There is also considerable satisfaction in being able to analayse the form of any race at any meeting even if, at the end of it all, the program advises against making a bet.



***Pro-Punter* advises caution in this race**

Snag two is that the program is less robust than it might be. Certainly the review copy went into a trance a few times. However, with the help of a screen instruction which appears if any fault is detected, the data was not lost and recovery was fairly painless.

Users are advised to turn off all surplus ROMs to avoid conflict with the protection mechanisms and, no doubt, improvements will be made (some changes were in progress at the time of writing). At all stages disc access is frequent and, if the filing system and drive unit are not in mid-season form, corruptions may occur. However, due to the separate stages of input, it is usually possible to back-track one stage and to continue as before without losing the fruit of your labours.

Snag three is that this is definitely not a program with which to occupy an idle half hour. Successive screens and menus lead the user carefully through the input stages but familiarity with the racing press is more difficult to acquire. One simple solution to this problem is to spend a few minutes in a betting shop talking to complete strangers, whose fluency in interpreting the printed data is quite amazing. They are probably all closely related to those mental giants who can work out darts scores and calculate three throws to win in split microseconds.

The alternative is to find a friend in the know. The friendly consultant for this review not only knew most of the answers, he was also the inventor of a racing system which works so well that, half-way through the second afternoon of its functioning trials, Ladbrokes refused to accept any more bets. The conclusion seems to be that, if the punter, with or without the help of a micro, is prepared to do the work, there is an arithmetical element in horse racing which can be harnessed to some considerable success.

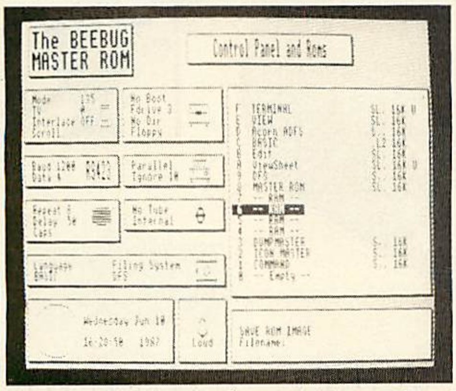
The final snag is that *Pro-Punter* may become addictive. The statement in the House of Lords by Lord Wyatt, Tote chairman, that: 'People are seldom more honestly occupied than when placing bets on horses' would not meet with universal approval, and addictive betting is socially bad news – but to be fair, addictive winning is widely acceptable.

However, the point is that *Pro-Punter* is cautious and selective. For those who enjoy an occasional flutter on the classics, their frequency of betting might be increased by the program, but rigidly following the advice given, their frequency of losing should diminish. Of course, it is tremendous fun to pick a winner in the Derby because its name strikes some chord. It is not quite so much fun when the wretched animal staggers over the finishing post a poor last.

Pro-Punter is available from DGA Software, PO Box 36, Ashton-under-Lyne, Lancashire OL7 9AJ. Cost £57.50 including VAT and postage. Runs on BBC B and Master with single or double drives. Needs Basic 2 or higher.

SOFTWARE

EXTRA FUNCTIONS FOR MASTER



Master ROM Beebug; BBC B/B+/ Master/Compact; £39 (25 per cent discount to members)

It was just getting to the point where I couldn't look at another utility ROM. I've seen millions of them, the good, the bad and the mind-bogglingly boring. They'll have to stop coming someday, I thought.

Wrong. With the advent of the Master we're now starting to see utility ROMs designed specifically for that machine. Beebug hit upon the brilliant idea of calling its offering the Master ROM, and instantly get zero marks for imagination.

Fortunately the software itself is quite good. It comes on 32k chip, which can cause a few fitting problems. You'll have to put it either inside the machine or in one of the high-profile cartridges.

The chip contains a number of commands which are useful to BBC B micro owners too, but it's mainly for those of us with Masters.

There are nearly 50 commands – too many to describe in detail here. Many are the disc commands which ADFS users wish were in the original filing system, including formatting, back-up, *CATALL, *DIRALL and *DIRCOPY.

There is a control panel, like the one you get on the Master's Welcome disc, but now available instantly. And the software also has a menu program, which acts as a fairly simple front-end.

One of the more interesting commands is *S. This is used when programming in Basic. It looks for a filename in the first few lines of code and then saves the program under that name, asking for confirmation of the name if you're about to overwrite an old file. Other features include commands to use sideways RAM as a silicon disc, part saving and comparing files, and the ability to find files buried deep in an ADFS directory structure. There is also a diary and alarm function, using the Master's real-time clock to prompt you with a beep and a message.

Alas, some of the commands, including the menu, wouldn't work properly with my hard disc. Otherwise, this is an extremely useful package for Master owners who want to make full use of the ADFS and sideways RAM.

Steve Mansfield

MASSIVE MEMORY

Advanced Quarter-Meg RAM; Advanced Computer Products; Master 128/ Electron; £79.95 (cartridge)

It's difficult to say how much memory the average BBC micro or Electron has these days. People keep producing memory extensions – like shadow boards and sideways RAM.

Now Advanced Computer Products (ACP) has managed to squeeze no less than 256k of RAM into a standard cartridge for the Electron and Master 128. The Advanced Quarter-Meg RAM, or AQR, provides 16 sideways RAM sockets, which can be used for running ROM images or as a silicon disc – or even a combination of both functions.

The company has also enhanced its Advanced 1770 DFS and *Advanced Control Panel* ROMs for use with the RAM cartridges. The control panel can now cycle through the 16 pages of sideways memory, allowing you to select any ROM images that might be in there.

However, most people are likely to use the 1770 DFS, which has new commands, and is being offered as a package with the AQR. Some of the commands have been extended to make full use of the 16 banks of memory, and two new commands have appeared. These are *SRACCESS, for write protecting and unprotecting the banks, and *SRPAGE, which is used to select which bank you want to use.

For example, if you have several ROM images stored in separate banks, you can switch between them as needed. The image is automatically initialised, so there's no need to hit CTRL-Break as you do when using the Master's *SRLOAD command, although there could be problems with ROM software which needs to claim work space to work properly.

If you're using the ACP DFS in the Master, you'll need to switch off the Acorn one or you'll get command clashes. Regrettably, this also switches off useful commands like *SRLOAD. Unfortunately ACP hasn't supplied equivalent commands in its DFS, so you'll need to have another utility ROM with a ROM image loading command, unless you are going to use the AQR just as a RAM disc.

Of course, there is no reason why you shouldn't do that. Indeed, that's how I found myself using it. It makes disc operations very fast. ACP has a demonstration program which loads in consecutive graphics screens, and the result on the Master is smooth animation with no screen flicker. It's only marginally slower when used on the Electron.

The fact that, using the Advanced 1770 DFS, you can configure the RAM disc to be any drive – including drive 0 – is a nice touch. Software which assumes you're working with drive 0 can still be used with the RAM disc.

Any of the AQR's RAM sockets can be used for the silicon disc – they don't necessarily have to be in a single block. That means you can have a variably-sized RAM disc, in steps of 16k, interspersed with ROM images.

The quality of the product is up to ACP's usual high standards. All it needs now is for ACP to provide a battery-backed version of the AQR. It may sound like I'm asking a lot, but the company is probably already working on it.

As it is, the AQR is a very inexpensive way of getting a RAM disc – which is how most people will end up using the cartridge. And with the latest version of the Advanced 1770 DFS, which you'll need for all the more interesting features, it forms a very fast and powerful filing system.

The AQR costs £79.95, or £99 if you buy it with the Advanced 1770 DFS. An inexpensive upgrade is being offered for existing 1770 DFS owners.

Steve Mansfield

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HARDWARE

MUSIC AT THE TOUCH OF A KEY

The new music package from Hybrid provides a highly sophisticated synthesiser. David Johnson-Davies calls the tune

The Music 4000 keyboard is the latest component of the Hybrid Music System. It complements the versatile Music 5000 synthesiser, which uses a system known as Ample for music notation and control.

In the Music 5000 you enter music from the computer keyboard either in stave notation, with the *Staff Editor* program, or alternatively in the Ample program's own compact notation, devised by Hybrid for representing multi-part music and sounds, and into which every composition is ultimately converted.

The new Music 4000 keyboard is a far more natural and convenient way of writing music. You can now enter notes in real-time, directly from the keyboard. By means of some clever software, the end result is converted to exactly the same Ample notation used by the other Music 5000 programs, so that it can easily be integrated into larger Ample compositions, or edited with other Music 5000 programs like the *Staff Editor*, the *Mixing Desk* or the *Notepad*.

The Music 4000 is a four-octave piano-style keyboard with a good feel compared to some of the cheaper synthesisers currently on sale. It plugs into the micro's user port, and is supplied with new software which replaces the original Music 5000 disc. This new software adds recently launched programs to the main menu: *Keyboard* and *Recorder*. It also contains improved versions of the existing programs, enabling it to be used as a music input device.

All the programs are very easy to use, and have the usual convenient Music 5000 user interface, where most parameters are altered with the cursor keys and the Shift key; you seldom have to type in numbers, or even remember what the valid range of inputs is.

Many musicians may consider that the sounds available from the Music 4000 and 5000, quite apart from the music composition facilities they provide, will justify their purchase. The *Keyboard* program lets you play on the keyboard, and at the same time it gives you control over the choice of



The basic Hybrid Music System with the new Music 4000 keyboard

instrument, and several other aspects of the sound not found on more conventional types of synthesisers.

Two example files supplied with the software give menus of 90 or so pre-defined instruments, covering just about everything you would find on a synthesiser. The first of these example files, called 'general sounds', includes some good standard instruments, like a cinema organ, a more church-like organ, strings, a harpsichord, and one of the best electronic imitations of a piano that I have heard. There are also percussive sounds, like drum and cymbal, and some more complex sounds such as a complete orchestra, reminiscent of the symphonic sound at the beginning of *Sergeant Pepper's*, several synthesiser and Moog sounds, and a vocoder sound like a human voice.

The second example file which is supplied, called 'special sounds', adds some more extraordinary effects including explosion sounds, and others best described as atmospheric. Although it's fun trying to guess what some of the more exotic sounds are from their abbreviated titles, it is a pity that Hybrid does not give a full list with more detailed explanations in the manual.

Having selected an instrument from the menu on the screen, you can play polyphonic music on that instrument. The number of notes that can be played simultaneously depends on the complexity of the instrument. Most instruments use two of the 16 channels, which means that up to eight voices can be played at once – a chord of eight notes can be sounded. The most complex sounds use all 16 voices, so if one of these instruments is selected only one note can be sounded at once. The keyboard comes with a foot switch which acts as a sustain pedal. For playing percussive instruments, the best effect is obtained by holding the pedal down so that all notes are sustained; a short lift of the foot pedal then acts as a damper.

If the pre-defined instruments do not give you quite the sound you want, you can edit and modify any of the definitions to create your own new instrument. The facility is the same as in the Music 5000 system, with the added advantage that you can now use the full range of the keyboard to try the sound you are designing. The keyboard interface provides six controls in

addition to the choice of instrument. These allow you to alter the effects created by the keyboard. And you can transpose the pitch of the whole keyboard up or down in units of a semitone.

A parameter allowing some quite unusual effects is Scale, which sets the pitch scale in 16th-semitone units. For example, setting Scale to −16 reverses the whole keyboard, putting the highest notes at the bottom; playing a familiar tune, by touch, on a reversed keyboard is quite thought-provoking. Setting Scale to eight gives a quarter-tone scale, allowing experiments in achromatic sounds.

Control of the stereo position of successive voices is provided by the Spread parameter, which takes two numbers, the position of the first voice, and the offset for each successive voice. For example, setting it to −3 1 spreads the eight voices from left to right across the stereo field.

The Split parameter is used for playing multi-instrument tunes, and allows each white key to be used to play a particular voice, rather than a different pitch.

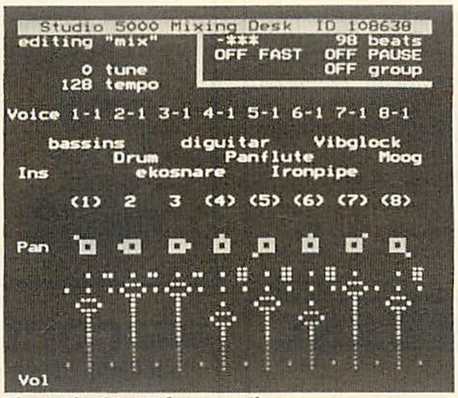
Single-key chords

Perhaps the most interesting controls are Reduce and Expand. These can be used in conjunction to create arpeggios, chords, echos and other effects with a single key.

To program one of these effects you first switch the Expand parameter to 'on.' The function of the foot switch then changes. With the foot switch pressed you play a sequence or group of notes to specify the effect you want. Then, with the foot switch released, each note on the keyboard will produce the specified pattern, transposed by that note's position.

For example, by playing a chord with the foot switch held down, the transposed chord is played for every note on the keyboard. Alternatively, typing a sequence (of up to eight notes) will cause that sequence to be played as an arpeggio for every note you play, transposed by the position of that note.

The Reduce control causes the volume of the successive voices to be reduced, giving echo effects. For example, programming Expand with the same note repeated eight times and setting Reduce gives an echo effect, which can be spread over the stereo field with Split. Used creatively, the Reduce and Expand controls enable a one-finger pianist like myself to create an extremely impressive sound.



Final mix-down of a recording

Playing music on the keyboard, in synthesiser fashion, is just the beginning. The keyboard is fully integrated with the other Music 5000 modules, and can be used as a means of entering and composing multi-part music. The music you create is stored internally in a universal notation used by all Music 5000 modules, and can be displayed and edited in staff notation, or in Ample's pure note letter notation. Furthermore, compositions created using the keyboard can be mixed in the *Mixing Desk* program.

The recorder comes complete with two pre-defined mixes, which can be used as a starting point for creating a composition. The advanced mix assigns six two-voice instruments to six players.

The recorder gives a metronome beat through the BBC micro's loudspeaker as a timing signal for playing a tune. You can either practise, using the Perform option, or record a part with the Record option. You then have the option of selecting 'Play original', which plays it back as you played it, or 'Play final', which adjusts the timing of what you played to the most likely whole time intervals. You can adjust this rounding effect with the Quantum setting, which is the smallest interval that will be represented in the final piece of music, but by making it too small you run the danger of getting a very complicated representation of what you probably intended to be a much simpler piece of music.

Having entered one part, it is converted into Ample notation and stored using a Make command (by pressing a function key). You can then record another part while listening to the parts you have previously recorded, just like multi-tracking in a studio. There are also several features which will appeal to those, like me, whose ambitions exceed their talent: you can record at a slow tempo and play back faster, and you can edit mistakes in any part or record a part in small sections for subsequent combination.

Ample notation

Because compositions built up part by part are converted internally to Ample notation, you can load the composition into the *Staff Editor* or *Notepad* at any time, and edit what you have composed using their respective facilities.

The Music 4000 keyboard can also be used to input notes to the *Staff Editor* and *Notepad*. In the *Staff Editor*, notes played on the music keyboard are sounded, and simultaneously appear in conventional music notation on the stave. The system even allows you to enter chords, which are displayed in the usual exploded way on the stave. The foot pedal is used for entering rests, or, if pressed simultaneously with a note, to lengthen its duration. Seeing the results of playing a keyboard instantly in staff notation must be one of the best ways of appreciating the meaning of conventional music notation.

With the addition of the Music 4000 keyboard it is possible to create music with very little knowledge, either of music notation, or of Ample notation, and I would recommend it to budding composers and musicians, or to any music lovers interested in exploring the many varied possibilities of music composition.

Despite the ease with which you can get started and create simple compositions, it is reassuring to know that the whole system is capable of the sort of performance that would easily satisfy a professional music maker, and I look forward to seeing the Hybrid Music System in the credits of more professional compositions.

The Music 4000 and Music 5000 together cost £330 inclusive; the Music 4000 alone (for existing owners of the Music 5000) is £169. Available from Hybrid Technology Limited, Unit 3, Robert Davies Court, Nuffield Road, Cambridge, CB4 1TP. A special amplifier, the Music 1000, is also available, and a Music 2000 MIDI interface has just been released.

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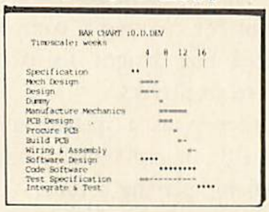
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SOFTWARE

A PROFESSIONAL VIEW

The latest addition to the *View* family is a wordprocessor. Or is it a spreadsheet? Or a database? Steve Mansfield tries to find out

Give people a wordprocessor and the first thing they'll do is moan. The same is true, to a lesser extent, of spreadsheets and databases. These are the most commonly used application, and people spend long hours in front of the screen with them, so there's always something missing, always some feature you'd like but haven't got.

No program will please all of the people all of the time, but *View Professional* is doing its best by solving one of the more frequent problems – that of needing wordprocessing, spreadsheet and database facilities all at the same time.

View aficionados coming to this program for the first time are in for a shock. On the other hand, *ViewSheet* users will feel a little more at home. That's because *View Professional* most resembles a spreadsheet. It's not a wordprocessor, as many people were expecting, but a document processor. If that seems like splitting hairs then it's more than likely you've never had to produce anything very complex with your wordprocessor.

You can look at it in two ways – as a spreadsheet that allows you to use large amounts of formatted text, or as a wordprocessor that can calculate. In both cases there are database features thrown in for good measure.

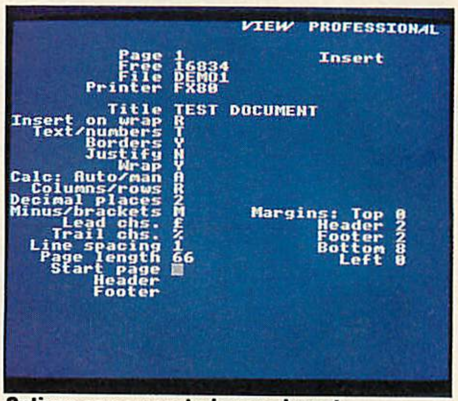
The screen is arranged like a spreadsheet grid. Each column can be set to a different width and has its own right margin, or 'wrap width', which needn't be the same number of characters. This means, for example, that text typed into column A could be 80 characters wide even though the width of the column itself might only be 10 characters. The text goes across the other columns. However, if you then type text into column B, on the same line – or 'row' – the text in column A will be truncated. It's complex to describe, but in practice you soon get used to it.

The program has all the usual wordprocessing features – word wrap, justification, block copy, move and delete, and so on. In addition, there are many novel features in the program.

As well as a filename, each file can be given a title. This is done on the formatting screen, reached from the editing screen by hitting Escape, but its effect can also be seen in the document. That's because the title can be automatically embedded in the text. The '@' symbol is used for this. It's followed by a character which identifies what you want in that position – a T is used for the title, but you could also use a D for the date, a P for the page number or a reference to a slot. Finally, you put a string of @s, equal to the largest number of characters your string is likely to be.

This is handy for all kinds of things. Inserting the date and page number is obviously useful, the title facility less so. But it could well prove handy if you're using the package for your accounts. You can have a standard form for invoices, say, and by having the year as the title insert it automatically into invoice numbers. The slot reference facility also has obvious uses, like putting totals calculated from rows or columns of figures elsewhere into some text. There is something very interesting about these @-fields which also applies to several of *View Professional*'s features. The effect of the command is seen in the edit screen – you see the actual date or page number, for example, except when the cursor is on the same line, when you see the command itself.

This is true of any ranged-right or centred text. Normally you see it just as it will appear, but when you move the cursor on to the same line the text jumps to the left-hand side of the monitor screen.



Options screen controls page layout

FIRST LOOK

With writing, your ideas either branch outwards or focus inwards. I'm a brancher. When I write with pencil and paper I end up with a heap of loosely connected bits of paper spread around the floor which then have to be pasted together. The great thing about bits of paper is that you can try out different ideas before getting out the glue.

Any wordprocessing package that wants to be more than a fancy typewriter has got to do a lot more than allow simple inserting and deleting. It has to sympathise with the user's own way of working, however peculiar that may be.

I was very excited when I first started using *View Professional.* Unlike *Wordwise* it promised me database functions and the ability to handle lists. But most exciting of all, it offered the facility to create and sort hierarchical lists, which are great handholders when it comes to planning.

This is potentially powerful. Most thinking combines figures, lists, notes, text, sorting and calculating. We need a wordprocessor that does all that in one box.

The second thing that excited me was the promise that *View Professional* could split the screen, which should help you to hold a contents page or notes on the same screen as your text. And I could aim at producing multi-column text too although lines of text kept disappearing from the screen when I moved the cursor to that line.

If your priority is writing, *View Professional* is not a tool that readily fits the hand. The manual does have a good tutorial section and I feel the experienced *View* user should be able to skip most of it, but I didn't feel confident or at ease with this complex system. I felt I was stumbling across its quite remarkable capabilities. Doug Selway



Spreadsheet functions within the text

Text highlighting is the other feature to use this idea. Up to eight highlights are available for effects like underlining and so on. In the case of highlights 3 and 6 the code is shown as a reverse video number. But highlight 1, which is reversed for underlining, causes the text to be underlined on screen. Highlight 2 works in a similar way, although in this case the effect is to embolden the text.

On-screen underlining and bold text is all very well, if you can edit the effects. This is one area in which *InterWord*, for example, is very weak. In *View Professional* there's no problem. Moving the cursor on to the same line as the text turns off the effects and reveals the commands as reverse video characters, like the other highlights.

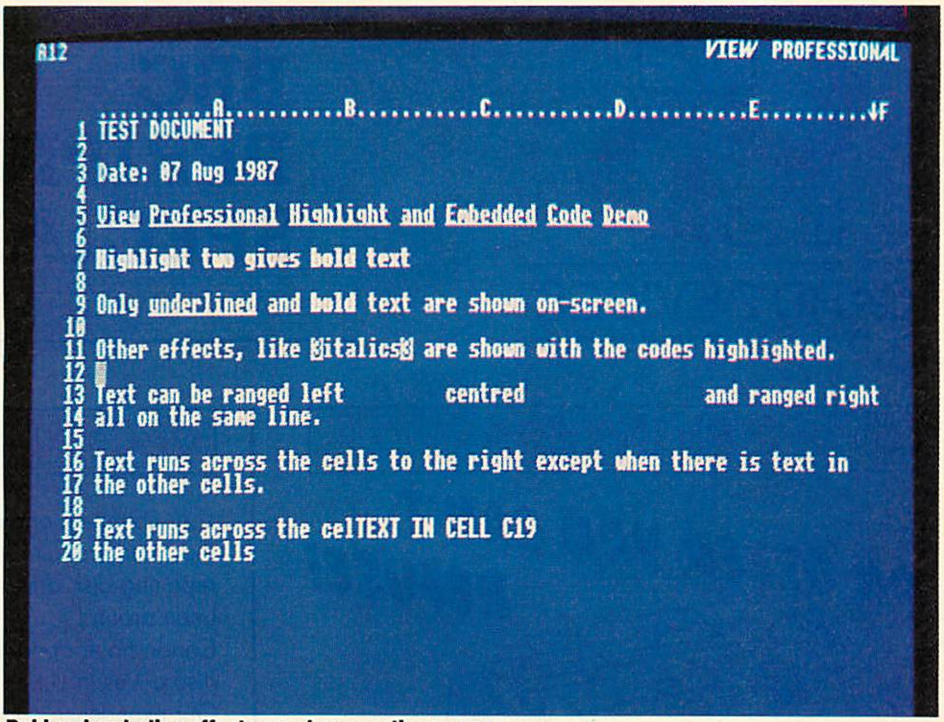
Incidentally, *View Professional* is planned to appear for the Archimedes. That version may well have other on-screen effects, like italics, superscript and subscript in the program.

The point about this system is that all the WYSIWYG effects, like underlining, ranged-right text and so on, are making the effects as easy to edit as possible. It can make the screen look very 'jumpy', with text leaping all over the place as you scroll around, but it's a reasonable compromise. Other on-screen features include the ability to freeze part of the screen, so that it's always visible while you scroll around the rest of the document. And it's possible to produce multi-column text, albeit in a fairly crude manner.

Any column can be sorted, numerically or alphabetically – which is the main database-like feature. The other is conditional output. When spooling, saving or printing a file, you can specify criteria. For example, you could save only those rows which have an entry in column A of over 10. And as *View Professional* recognises dates as a valid value type you could do a similar operation on entries before, on or after a certain date.

The software is command driven. You type a backslash followed by a code and any necessary parameters. This makes it easy to write command macros using exec files. Although the system starts up with all the function keys configured, you can change the action of any or all the red keys if you see fit.

Three versions of *View Professional* are supplied. There are two ROMs, plus images of those ROMs supplied on disc for people with at least two banks of sideways RAM; and a second processor version. Both 3.5-inch and 5.25-inch discs are supplied, so you actually get the software no less than five times!



Bold and underline effects are shown on the screen

SECOND LOOK

So who wants a wordprocessor that looks like a spreadsheet? That was my initial reaction when I first saw *View Professional.* It was difficult to see what would make it worthwhile changing from my familiar wordprocessor. Then, within an hour, someone asked me to arrange a *View* file of 350 words into alphabetical order, and suddenly I saw the value of a sorting command.

As a regular *View* family user, I found some features familiar, and was able to type simple letters without recourse to the manual. But others remained opaque at first – trying to enter multi-column text was a problem to begin with.

***View Professional* presents a good blend of facilities, but check which version you will use – the spreadsheet facilities of all but the second processor version are limited, lacking all trigonometric functions.**

Being unable to change the screen mode or colour within the program is disconcerting – you have to do it before you start.

For the experienced user, the manual is less than ideal – for example, converting from *ViewSheet* to *Professional* format is covered in the single phrase. SheetVP converts a *ViewSheet* 'contents' file, created with the PC command. . .' But how do you create a 'contests' file?

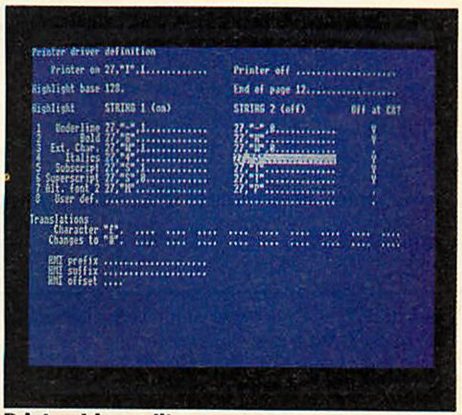
One feature I am particularly pleased to see is the ability to reassign all the function keys using the /DK command. In fact you can redefine all the keys automatically using an exec file.

The printer driver editor is a big improvement on the *View* original, with screen editing of the printer control codes. And old *View* printer drivers are still compatible with *View Professional*, providing you stick to highlight 1, 2 and 3. Graham Bell

The system comes with an extremely easy to use printer driver editor, an extensive manual and a function keystrip.

The program really is very powerful. We've only been able to cover a few of its features here. I can see it proving popular with anyone producing financial or technical documents. It's ideal for tables, with its calculating and sorting features.

That said, I wouldn't go near it if I just wanted to write. As a wordprocessor it fails to impress. It has improvements on *View*, but also some limitations. For example, if you use rulers scattered throughout your text in *View*, you'll have a hard time with *View Professional* – you simply can't do that kind of thing. Finally, *View Professional* can be tricky. Its column-based formatting of text can lead to confusion and mistakes. It's certainly not a package designed for beginners.



Printer driver editor screen

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Tel: (0324) 558692
Inverclyde: Inverclyde BBC Micro Users Club: Robert Watt, 38 Wellyard Way, Greenock, Renfrewshire PA16 0XG
Tel: Gourock 39967

WALES

Cardiff. Cardiff BBC Computer Club: Geoffrey Barker, 2 Whitcliffe Drive, Penarth CF6 2RY
Tel: (0222) 701023

N. IRELAND

Belfast. Belfast Computer Club: Andrew White, 19 Greenpark Drive, Markethill, Co Armagh BT60 1PX

OVERSEAS

Australia: BBC Users Group of Canberra: PO Box E58, Queen Victoria Terrace, ACT 2600
Australia. Beebnet: M A Cowley, PO Box 262, Kingswood, South Australia 5062
Australia. Ozbeeb Sydney, meetings North Ryde, PO Box 1030, Parramatta 2150
Tel: day 635 4868, eve 868 4455
Australia. Dapto BBC User Group: PO Box 447, Dapto, NSW 2530
Canada. Atom Users Group of Canada: John Wood, 812 Cabot Trail, Milton, Ontario L9T 3M8
Canary Islands (Spain). BBC Micro Club Tenerife: PO Box 560, 3800 Santa Cruz de Tenerife
Eire. Irish Amateur Computer Club: Austin Vaughan, 35 Monastery Drive, Clondalkin, Dublin 22. Tel: 01-593112 (eves)
Eire. OIFIG (Official Irish Forth Interest Group): c/o Hugh Dobbs, Newton School, Waterford
Finland. Arien Raateland, Hopeatie 10A21, 00440 Helsinki 44
France. Club Informatique Assevent: Claude Laurent, 1 rue du Marechal Leclerc, Assevent 59600. Tel: (27) 652294
Greece. Microclub: C Mantazavinatos, 17 Stournara Str. 106 82 Athens
Hong Kong. Acorn Computer Users Society of Hong Kong: PO Box 13330, Central PO, HK
Malaysia. Sabah Computer User Group: c/o Albert Vun, PO Box 69, Kota Vun, Sabah, Malaysia
Malta. BBC Micro Users Club (Malbeeb): Ray C Zammit, 20 Oleander Avenue, Santa Lucia
Netherlands. Big Ben Club:
J W Vuurpijl, Hein Baderstraat 36, 2171 XP Sassenheim
New Zealand. BBC/Acorn Computer User Group of NZ: PO Box 9592, Wellington
New Zealand. Christchurch BBC & Electron Users Group: Mrs Rebe Nolan, 87 Palmers Road, Christchurch 9
Norway. BBC INFO: Horten Ingenlorhogskole, Skippergt. 6, 3190 Horten
Norway. Skandinavian BBC User Group: Frans-Otto Hendriks, Ludvig Karstensvei 14, 1064 Oslo 10
Pakistan. BBC Users Group:
Capt. Z A Kidvai. Tel: Karachi 540986
South Africa. Acorn Atom Users Group: J G Dowling, 27 Oribi Avenue, Van Riebeeck Park, Kempton Park 1620
South Africa. Pretoria BBC Users Group: Stan Miller, PO Box 117, Montana 0151
South Africa. Tygerberg BBC User Group (Tygerbug): R P Donavan, 16 Bakker Street, Welgemoed, Bellville 7530
Sweden. BBC User Group: Anders Wichman, Folkungagatan 58, 11622 Stockholm
Sweden. Acorn User Society of Sweden: Tord Israelson, Tuppa Klaras Vag 12, S-702 29, Orebro, Sweden
Tasmania. BBC Users Group (Tasbeeb): Box 25 PO, North Hobart 7002

SPECIAL INTEREST

Accounts. BEEBACC: Brian Pain, 40a High Street, Stony Stratford, Milton Keynes
Tel: (0908) 564271
Adventure. International Adventure Club: Simon Martin Clarke, 10 Ennis Close, Harpenden, Herts AL5 1SS
Atom. Acorn Atom User Club: Kevin Roll, 66 Shaldon Drive, Morden, Surrey
Tel: 01-540 5282
Bulletin Boards. Forum 80: 421 Endike Lane, Hull HU6 8AG
CP/M. CP/M User Group: Diana Fordred, 72 Mill Road, Hawley, Dartford, Kent
Tel: (0322) 22669
Disc Users. Format 40/80 Club (BBC Disc User Group): Peter Hughes, 5 Marsh Street, Bristol BS1 4AA
Econet. User Group (Scotland): c/o Michael Ryan, Balkeerie Cottage, Eassie, by Forfar, Angus
Education. Micros and Primary Education (MAPE): c/o Mrs G Jones, 76 Sudbrooke Holme Drive, Sudbrooke, Lincs LN2 2SF
Electronics. Alton Computer & Electronics Society: Kevin Weatherhead, Sheen, Old Odiham Road, Alton, Hants GU34 4BW
Tel: Alton 87478
Heraldry Society. Colin Forrester, 5 Hook Road, Epsom, Surrey KT19 8TH
Logo. British Logo Users Group (BLUG): Richard Olney, c/o London Technology Network, 86-100 St Pancras Way, London WC1
MUSE. PO Box 43, Houghton on the Hill, Leicester LE7 9GX. Tel: (0533) 433839
Radio. AMRAC (Amateur Radio and Computers): Mr T Triggel, Gleness, East Boldre, Brockenhurst, Hants SO42 7WD
Tel: (0590) 612130
RAF Personal Computer Association: Sqn Ldr J A Upham, Man S (ADP), HQ RAFSC, RAF Brampton, Huntingdon PE18 8QL

ACORN USER ADVERTISEMENT PAGES – OCTOBER 1987

FREE ADS

BBC disc drive users wanted as penpals to swap tips, etc. Write to A Walker, 2 Arnold Lane, Gedling, Nottingham NG4 4BE.

Penpals wanted to swap hints, tips, info, including disc, m/code and SWR. Write to: Ian Salmon, 18 Fillioll Close, Hanningfield, Essex CM3 8UX.

Penpal wanted who owns an Electron. Write to: Samuel Day, 22 Castle Street, South Glamorgan, South Wales CF6 8JR. All letters answered.

Written any good sprite routines? Help a struggling student and write to Vince, 8 Springwood Avenue, Stirling FK8 2HN. (BBC B + disc).

French BBC user wants correspondent in England. In English or French. Patrice Godiani, Le Verdi 3C Ave. Jean Moulin, 83400 Hyeres, France.

Penpal wanted for BBC B owner, to swap tips, demos, etc. Matt Evans, 5 Frank Crosse Drive, Upton Magna SY4 4TS.

Penpals wanted, swap hints and tips. 2Meg 32k board £33. AMX Mouse £21. *Super Art* ROM £35. *Pagemaker* £35. Tel: 01-968 3454.

BBC B DFS 40/80 drive. High res., green monitor, APTL board, +16k toolkit, *D. Doctor, Database, InterWord, SpellMaster* ROMs + more, books & software. £650 ono. Tel: (0628) 31987.

UMI 2B Sequencer, DX100 Yamaha Synthesiser, Roland 707 drum machine, Roland amplifier (stereo) +two boxes, FB01 Synth. All in mint condition, incl all cables. Any offers considered. Tel: (0932) 58065.

Brother HRS printer (Thermal) serial interface, including paper, ink and lead. Hardly used. £60 ono. Tel: 01-397 9579 (evenings).

64k Electron Plus1 Plus3 user port. *View, Viewsheet, Viewstore,* ARM, *T2P3(2), Art,* 10 discs, assorted software, all manuals, £300. Tel: 0734) 665180.

Solidisk 4Meg 32k board £30. Old type 32k SWR £15. BBC data recorder £15. Amber 4000 printer £40. Tel: (0768) 64890.

Electron E2P second processor, plus operating software, £50 ono. Tel: Taunton (0823) 256850 evenings.

BBC B with disc interface, and two 80-track drives. Separate power supply £340, ono. Tel: Doug. (0368) 76435, evenings.

BBC B, 12 ROM board, DFS, 40/80-track disc drive, MXP-1080 printer, *Pagemaker, SuperArt* + Mouse, *Wordwise, Dumpout 3, Toolkit,* £500. Tel: 01-459 3070.

Wanted Plus 1, Plus 3 or Slogger equiv for Electron. Send details and price to: D Lane, 5 Tile Farm Road, Orpington, Kent BR6 9RY.

Two Cumana 40-track 100k disc drives (with PSU), one drive 0, one drive 1. £60 each. Tel: Mike 051-639 4516, after 6pm.

Acorn *ADFS,* £15. Acornsoft ISO – Pascal stand-alone generator, unused, £20. Tel: (0704) 77864.

BBC B 40/80-track disc drive, modem, green-screen monitor, cassette recorder, *Pagemaker,* music system. More software, joysticks £450. Tel: (0902) 758026.

BBC Master 128k, as new, with advanced handbooks and three cartridge, cost £530. Accept £380. Tel: 01-557 6389.

BBC all manuals, Acorn DFS Sidewise, Cumana 40-track ROMs, *Wordwise Plus, Ultracalc, InterSheet,* many games disc/cassette. £450 ono. Tel: (0837) 3046.

Akhter 5.25-inch double-sided 40/80-track switchable disc drive, with integral power supply, £85 ono. Phone Jeremy on 01-554 0037.

Wanted 6502 second processor with or without HiBasic. Tel: (0745) 825036 anytime. Ask for Paul.

Bargain! Master Compact new! Won in competition. Keyboard, colour monitor, disc drive, nine month guarantee. £500. Tel: (0622) 27238, evenings.

Electron Turbo Driver disc drive, games, leads, manuals etc., £230. Electron ROM Box, graphics chip, data recorder, games, £120. Tel: Horndean (0705) 595691.

Acorn Bitstick £165, boxed as new. Global products P8000 industrial, EPROM programmer, £275. Tel: Paul Derby (0332) 362798.

ATPL SR Board. Twin 40-track s/s d/drives, plus *Page,* PSU, *Help, Spellcheck, Sleuth, Toolkit* plus ROMs. Half price. Tel: (0635) 62391 (after 2100 hrs).

Electron Plus 1, Plus 3, PMS E28 (65C02), Hi-Basic, Lisp, graphics ROM, *View, ViewSheet, Database,* utils, games, mags: £360. Tel: 051-546 1543.

Namal Type and Talk speech unit wanted. Instruction guide to fit unit to BBC. Can anyone help? Tel: (0293) 21831.

Computer desk with TV stand and shelf 48.5 x 24.5 x 28.5. £30. Also Watford Electronics *Dumpout 3.* Printer dump ROM for the BBC micro. £14. Tel: 061-223 5068.

Master 128 plus Turbo 6502 second processor. Boxed as new. £450. Tel: (0223) 812322.

Philips LFH290 pocket memo, LFH505 dictation transcriber. New. Unwanted prize. Retails at £315, yours for £240 ono. Tel: (0223) 357411.

Modem owners! Ring UK's leading bulletin board, using the top leading HBBS+ software. The Belle Vue Board. Tel: (0274) 498221.

Electron, Plus 1, Track-ball plus software, data recorder, over 35 software tapes, *View,* 29 EUM manuals FBJI+CT. £130 ono. Tel: 061-643 9179, after 6pm, Paul.

Electron Plus 1, data recorder, Acorn JP101 printer, seven ROM cartridges, including *View,* software (mostly Acornsoft), books. All boxed. £160 ono. Tel: 661 8684 (daytime).

BBC B issue 7. Joystick, data recorder programs. *View* wordprocessor + manual. Good reason for sale. £250. CZ101 polyphonic Midi synth, case £185. Tel: 01-609 7504.

BBC B Acorn DFS, dual discs, Epson RX80, *Wordwise Plus, Disc Doctor, Beebcalc, Printmaster, Toolkit,* Microvitec monitor, masses of disc/tape software, £500. Tel: 051-928 7457 after 6pm.

BBC B DFS disc drives colour monitor, AMX Mouse, many extra ROMs, much software, worth £1000, sell £850 ono. Tel: (0865) 68037.

For sale: BBC B, disc drive, DFS, AMX mouse, 32k sideways RAM, joysticks and much software. Tel: Dave on (0405) 861186.

Full set of *Micro User* and *Acorn User* from issue No 1 to date. Offers? Tel: Sheffield (0742) 745027.

Acorn 6502 second processor, DNFS, Hi-Basic, *Hi-Wordwise Plus* as new, £95. Also Watford DDFS £40. Tel: Adrian 01-992 4935.

32k sideway RAM for sale Ring Adam, (0295) 65857. After 6pm.

Wanted Plus 3 disc interface for Electron or any other 3.5-inch disc drive with PSU. Tel: Stewart on (0968) 76708 after 6pm.

Printmaster ROM, unopened £15. Pack wet disc head cleaners £2.50. Wanted medium/high res colour monitor. Tel: (0924) 263503.

BBC B computer +DDDFS £235, two 1 megabyte drives £100 each, monitor £50, daisywheel £235, *View* chips etc. Tel: 01-202 8540.

BBC disc drive, 100k single sided with cables. Utility disc £40 ono. Electron *ViewSheet* ROM, brand new £10. Tel: 091-586 5587 after 6pm.

Printers: 8056 Dixons, RS232. £40. MCP40 colour plotter both with manuals £40. or £75 both. Tel: (0375) 379901, Spencer.

BBC B, Acorn DFS, Teletext Adapter, Cumana 100k disc drive, tape recorder. Lots of games, magazines, books. Will sell for £520. Tel: 01-854 6283. Jimmy after 5pm.

Power supply (BBC) brand new, only £40 ono. Tel: (0224) 642765 evenings, (Alan).

BBC B OS 1.2, Acorn DFS 40-track single sided drive, games, lockable disc box, 50 ds dd discs, mags leads, manuals. £320 Tel: (0382) 68601.

Swap tuner/amplifier; boxed, unused, value £110, for BBC B hardware such as mouse, teletext adapter, digitiser etc. Tel: (028 373) 2529.

Wanted AMX Mouse or similar plus single/double sided disc drive 40/80 track switchable, also ATPL *Sidewise.* Tel: 051-733 8654 after 6.00pm.

Unused Acorn ADFS ROM, manual, disc £20. Also Acorn Basic 2 £10. Watford DFS ROM+ manual £6. Tel: (0532) 740656.

Beginner? Electronic package: two computers, printer, recorder, hardware, talk-back, literature, Big-trak Robot, lots more. £159 ono. Tel. (045822) 3914.

Solidisk problems? Advice, cures, help. Join Solinet User Group. Send sae to Solinet, 13 St John Street, Bridlington YO16 5NL.

SWR128 +15 discs: £45, Prism 2000 modem +ROM: £20, WE dual joysticks: £10, WE lightpen +software: £10, 27128: £2. Tel: 051-220 5470.

BBC Master, double drives, some original software, 25 blank discs, ROM cartridges etc, £530. Contact Richard on (08894) 6772, evenings only.

Microvitec monitor, standard resolution. Two years old, including BBC lead, £95 ono. Tel: 01-653 4325.

Wanted BBC B. DFS-less preferred, without add-ons. Cash waiting for good condition, late series machine. Tel: (049481) 3222 evenings.

Dragon 64 + disc drive + software worth £600+, sell £185 ono or swap DS-DD 80-track dual drive +PSU. Buyer collects. Tel: Paul 051-924 1727 evenings only.

BBC B, + Cumana dual, switchable drives, Philips hi-res monitor, *View,* 64k sideways RAM, joysticks, software, books. £695. Tel: Simon (04022) 51253.

BBC B Watford DFS, 40/80 drive, *Replay* mouse, *Superart* ROM, games, magazines, lots of books. £380 ono. Tel: (0656) 880961

Morley Teletext Adapter with advanced system ROM, utilities disc and power supply unit, £50. Tel: 01-952 7224.

BBC B ATPL, ROM/RAM Board, EPROM Programmer, Challenger 3 drive, over 100 programs, Megamouse, joystick, documentation, five ROMs, 32k SWR, £695 ono. Tel: (05086) 3517.

BBC B, 128k SWR, CDC 40/80, DS/DD disc drive, Epson P40 printer, joystick, and lots of software £350. Tel: (0706) 341041.

32k sideways RAM for sale. Ring Adam, (0295) 65857 after 6pm.

FREE PERSONAL AD SERVICE

Fill in the form below to a maximum of 20 words (one in each box) and send it to *Acorn User* Free Ads, 141-143 Drury Lane, London WC2B 5TF. Please use capital letters, write clearly, and remember your name, address and telephone number. Without this full information, supplied on a separate sheet of paper, we regret we cannot carry your Free Ad. We cannot accept entries selling or swapping software. This is a service to readers – no companies please. One entry per form only. Free Ads are carried in the magazine as space permits, and any Free Ads not used within a month of receipt will be disposed of.

ACORN ABUSER'S

DIARY

Show me the way to go home



Hysteria reached a peak at the *Acorn User* show when investigative journalist and ex-fighter pilot Phil Rotsky stumbled into the Barbican carrying a large and suspicious parcel.

'It's the 68000 second processor,' Rotsky explained to fellow hack Orson Fact, 'Amazin', init?' He plugged it into the Archimedes, using surprisingly few leads.

With gasps from the assembled crowd, the Archimedes screen burst into life, with *Gauntlet* – the game of the moment. There were the graphics that had gripped the imagination of all games players, at least as good as the Atari version.

Fascinated crowds and bemused Acorn staff looked on as games supremo David Lawrence put *Gauntlet* through its paces. Meanwhile, Rotsky made his excuses and left.

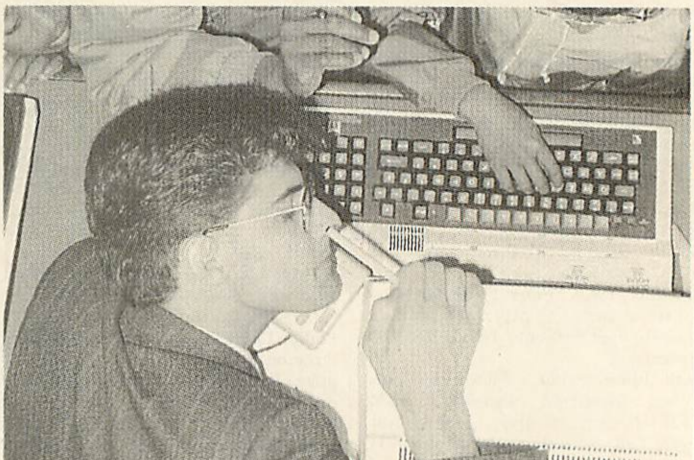


EMR's ever-theatrical Mike Beecher has not denied that his driving prowess made attending the *AU* show an expensive trip.

After being clamped earlier this year, he is counting the cost of a speeding ticket on his way to the Barbican.



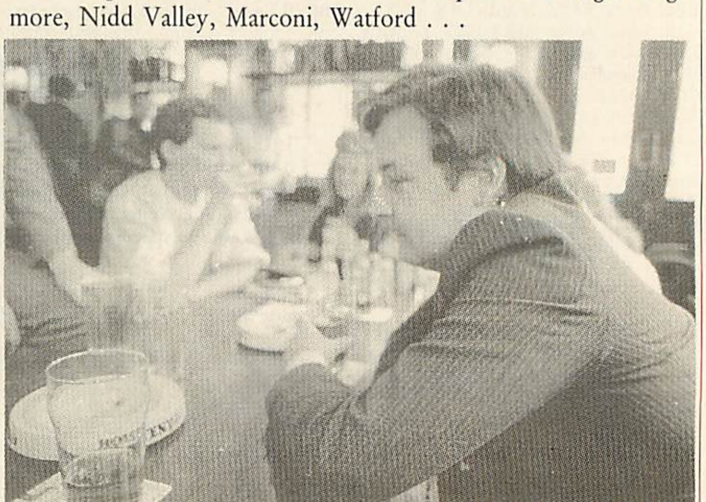
Ed Quinn listens quietly to John Cope who opened the show



Watford staff dealing effortlessly with the public

■ Who were the people at the exhibitor's party who so desperately wanted to get their names into Acorn Abuser? Even resorting to threats of violence and minor acts of hooliganism will not get them named.

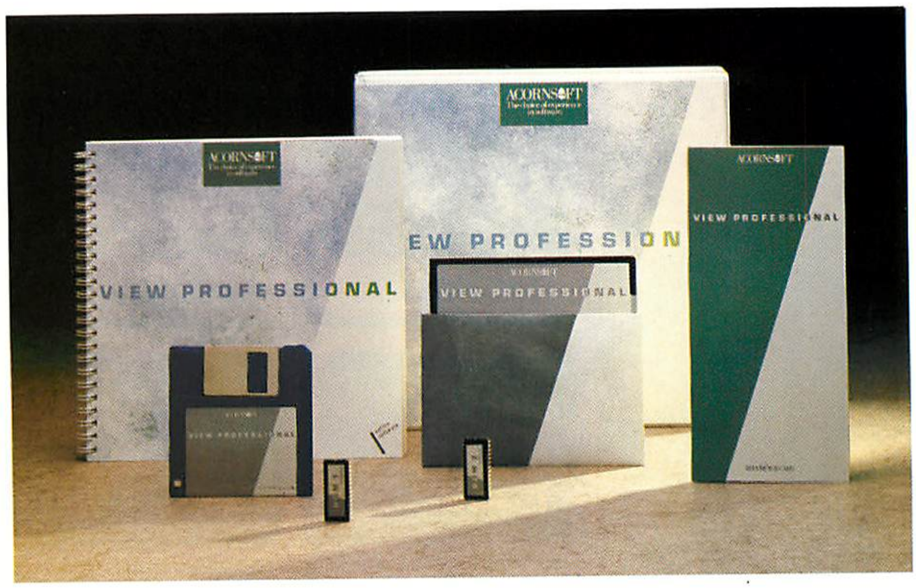
We might mention their illustrious competitors though: Wigmore, Nidd Valley, Marconi, Watford . . .



David Atherton sighted under a table in a pub during the show

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